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LAUREL-NUT OIL.

BY DAVID HOOPER.

The Alexandrian laurel (*Calophyllum Inophyllum*, L.) is distributed throughout India and Malaya, and is especially abundant on the western coast and in the native state of Travancore. The Hindustani name of the tree is Sultan Champa, the Tamil and Malayalam name is Punnai. Its thick green and glossy leaves resemble those of a laurel, but the tree is far removed from this family of plants, as it is really a Guttifer, belonging to the natural order Clusiaceæ. The fruit is about the size of a bantam's egg when ripe, and of a greenish yellow colour; when dry it is brown or black and has a hard wrinkled surface. The seed, consisting of two white closely united hemispherical cotyledons, loses in drying 30 per cent. of water, and the dried seed yields 68 per cent. of fixed oils. This oil is largely used for burning, and is occasionally used for making varnishes and soap. In medicine the oil is employed either alone or mixed with more powerful remedies as a liniment for rheumatism, and is applied to ringworm and various skin eruptions. The tariff valuation of laurel-nuts in Travancore is Rs. 7 per cwt. and the oil Rs. 8 as against cocoa-nut oil Rs. 14 per cwt. The value of the exports of laurel-nut oil from Travancore during the past five years has been as follows:—1882-83, Rs. 74,314; 1883-84, Rs. 68,767; 1884-85, Rs. 48,997; 1885-86, Rs. 78,845; 1886-87, Rs. 57,148. In 1886-87 63 cwt. was exported from Alleppey. Dr. Watt says that although this oil cannot compete with castor oil for industrial purposes in the Calcutta market, it fetches about four times the Calcutta price of castor oil in Burma.* In the Colonial and Indian Exhibition† held in London in 1886, this oil was shown from India, Ceylon, Straits Settlements, Queensland and Fiji. It is known out of India as domba, dilo or ndilo oil.

Laurel nut oil is greenish-yellow, bitter and aromatic, but it has not been investigated chemically. Lépine found a sample to have the sp. gr. 0·942, and to solidify at +5°. During a recent visit to Travancore, I found a large trade being done in the nuts and oil of *Calophyllum Inophyllum* in the village of Neyoor, about sixteen miles from Cape Comorin, and here I purchased a sample of oil for examination. The oil was similar in appearance to some I expressed myself from some freshly dried almonds obtained from Neyoor. The following notes give the results of a chemical examination of the oil made with the assistance of Allen's 'Commercial Organic Analysis.'

The oil had a greenish-yellow colour, thick consistence, fragant odour and bitter taste. It commenced to congeal at the temperature of 19° C., and became quite solid at 16°, when it had a specific gravity of 0·9315.

The free acidity of the oil was found by shaking a weighed portion with alcohol and titrating the solution with normal alkali, using phenol-phthalein as an indicator. One hundred grams of the oil required 1·89 grams of caustic potash to neutralize the free acids.

The oil was saponified by boiling a weighed quantity for one hour with alcoholic potash, and the excess of alkali was determined by titration with normal hydrochloric acid. It was found that 100 grams required 19·6 grams of KHO to convert it into a soap; the saponification equivalent was therefore 285·6. The soap solution in alcohol, allowed to stand for a few hours partially crystallized into lustrous white scales.

The volatile fatty acids obtained by Reichert's distillation process were very small in quantity, 2·412 grams of oil required the equivalent of 0·1 c.c. of normal alkali for saturating the volatile acids, which is equal to 0·23 per cent. of KHO.

Two drops of sulphuric acid added to 20 drops of the oil gave a red coloration with orange streaks; after stirring the whole became an orange-brown mixture. The oil shaken up with an equal volume of nitric acid, sp. gr. 1·4, formed a light reddish-brown emulsion; after standing for an hour the oil separated with a rich mahogany brown colour, and the lower acid liquor was red. Treating the oil according to Poutet's elaïdin Reaction, and working at a temperature of 20°, the mixture of oil and nitric oxide solution congealed in two and a half hours; after twenty four hours it remained as a firm butter-like solid of a dull lemon colour, and yielding to the pressure of the finger.

5·045 grams of the oil were on November 7 exposed to the air in a watch-glass under a bell-jar, and weighed daily for one month. The increase in weight was just appreciable after the exposure; the weight on December 7 was 5·047. This quantity of oil heated in a water-oven at 93° for eight hours gained 0·006 gram only.

The insoluble fatty acids amounted to 90·85 per cent. They crystallized into radiating tufts of acicular crystals, having a melting point of 37·6°, and a specific gravity of 0·9237 (solid) at 16°, and of 0·8688 at 90°. Their mean combining weight, obtained by titrating the washed and dried acids with normal alkali and using phenol-phthalein as an indicator, was found to be 283·1. A lead soap of the fatty acids was made by decomposing the potash soap with a hot solution of plumbic acetate. After washing and drying, 1 gram was weighed out and shaken up with ether; the oleate of lead, or soluble lead soap, weighed ·44 gram after the ether had been rapidly driven off. The lead soap insoluble in ether was decomposed, and the purified fatty acids had a melting point of 58°.

The oil agitated with 85 per cent. alcohol removed the green colouring matter and a sticky extract possessing the peculiar melilot-like odour and the bitter taste. This extract amounted to about 7 per cent.; it was almost entirely soluble in dilute alkalies with an orange colour, precipitated unaltered on the addition of acid, and was perfectly soluble in ether and chloroform. The green mass was boiled with water and the filtered liquor evaporated had the odour of coumarin, but no rhombic crystals of coumarin could be observed in the slight residue when examined under a microscope. The alcoholic residue was crystalline, and contained some free fatty acids of the oil.

The conclusion arrived at from the examination of the laurel-nut oil is that it cannot be regarded as a drying oil, nor altogether as non-drying, but must take up an intermediate position between the two. In endeavouring to classify this oil with those that have already been investigated, the task is not difficult. Most of the experiments exhibit

* 'Guide to the Economic and Commercial Court,' Calcutta, 1886.

† *Pharm. Journ.*, [3], xvii., pp. 6, 142, 226.

in a very striking manner a strong relationship to those of the cotton-seed oil group. The saponification equivalent, the high melting point of the fatty acids and the free acids are very remarkable, and the sulphuric and nitric acid tests are particularly allied to those performed upon cotton-seed oil.

NOTE ON SYRUPUS CROCI.

BY C. J. S. THOMPSON.

Although saffron is not now regarded of much value as a therapeutic agent, the syrup is still frequently used and prescribed in medical practice of to-day, in many parts of the country. The official tincture, which is presumably retained in the Pharmacopœia on account of its colouring properties, is very seldom used, but there seems to be a want of a good formula for the preparation of a satisfactory syrup.

A century or more ago saffron occupied an important position in the Pharmacopœias of the countries of Europe, and was considered useful as an emmenagogue, and also for its stomachic and antispasmodic properties, doubtless due to the action of its volatile oil.

We meet with it in the form of aqueous and alcoholic extract, infusion, spirit, aqueous and vinous syrup, tincture and wine. When prepared in the usual way by means of sugar simply dissolved in a watery infusion, the product does not keep satisfactorily, and does not long remain bright and clear. The following formulæ, taken from several old Pharmacopœias and Dispensatories, are interesting:—

No. 1. (German)—

℞ Saffron	1 oz.
Boiling water	1 pint.
Refined sugar	2½ lbs.

Macerate the former in a covered vessel for twelve hours, then filter the liquid, and form a syrup with the sugar.

No. 2. (1720)—

℞ Oriental saffron	℥vj.
Boiling water	ℨx.

Infuse for three days in a closed vessel, express, and dissolve in the infusion—

White sugar	1 lb.

No. 3. (Van Mons)—

℞ Saffron	1 part.
Water	8 parts.

Infuse for six hours in a water-bath and express; again infuse the residue in water, 8 parts, mix the two strained infusions, and add—

White sugar	28 parts,

and make a syrup.

No. 4. (France)—

℞ Croci	1 oz.
Vin Malaga	1 lb.

Macerate for two days, then express lightly; set the liquor aside, decant and add—

Sacch. alb.	1 lb. 10 oz.

make a syrup.

The following formula can be recommended as producing an excellent syrup of good colour:—

℞ Saffron	℥iij.
Boiling water	ℨx.
White sugar	1½ lb.
Rectified spirit	ℨiss.

Infuse the saffron in boiling water for six hours and strain; set aside till cold, then heat to the boiling point and filter. Dissolve the sugar in the filtrate by means of gentle heat, and when cold add the rectified spirit. The product will be found to keep well, and remain bright and clear without precipitating.

THE ACTIVE PRINCIPLE OF RENNET, THE SO-CALLED CHYMOSIN.*

BY DR. L. H. FRIEDBURG.

The study of the formation of cheese from milk by means of rennet extract has always been a very inviting one. While the cheese manufacturers endeavoured to find out how to obtain a very active rennet extract, and for a number of years manufactured it themselves, they were careful at the same time to study the conditions under which such extracts acted. Scientific chemists in their researches, added, as a matter of course, the critical inquiry into the nature of the active principle, its preparation and the manner of its chemical action.

At first sight the chemist is inclined to compare. Glancing at the curdling of milk he finds that a comparatively small quantity of the curdling substance acts upon a relatively enormous quantity of liquid with a given effect. He knows of similar actions more or less unexplained in the vast territory of general chemical reactions, I mean those which in former times were called "catalytic," and which, at present, are generally known as "contact" actions. I recall the formation of ammonium nitrite from ammonia and air in the presence of a glowing platinum spiral, or of formaldehyde from methyl alcohol, under similar conditions. He understands that in these cases the contact substance in a glowing state acts as a conveyer of oxygen. In the general case of etherification the sulphuric acid is no longer considered as a "contact" substance, since we know that the part it plays in these actions is that of taking up the elements of water with which it dilutes itself, from two different chemical compounds containing them. The study of this latter case has contributed much to the present tendency to assume that all the so-called contact actions, when sufficiently studied, will prove to be simple chemical reactions under peculiar conditions.

From a chemical standpoint we are not yet clear as to the peculiar action of rennet upon milk; more than that, we have not yet studied the chemically active principle so as to be familiar with it as we are with sulphuric acid, or even with glowing platinum.

In our case matters are, moreover, complicated by the fact that several substances have the peculiarity of curdling milk, such as certain juices extracted from plants;† that a precipitation of casein, by means of acids, different from the real curdling of milk by rennet, may take place and confuse the observations; and finally, that the state in which the casein is actually contained in milk (let us call it the physical state), seems to be a very peculiar one, perhaps similar to glue, when we speak of its colloid nature to absorb water and swell with it, so that the entire fact of the curdling of milk by means of rennet cannot be expected to offer us simple conditions of observation.

Since we do not feel justified in assuming that the active principle in milk coagulation is the same in an extract of the stomach of ruminants and in the juices of certain plants, we are led to suppose that different substances react here in a similar manner upon one and the same body. By means of such conclusions we may succeed in devising correct experiments for the solution of the question before us.

Let us first see then how far we have succeeded in this up to the present time.

We find that the coagulation of milk by means of rennet depends upon the quantity of rennet added, as

* Read before the American Chemical Society, May 4, 1888. From the *Journal of the American Chemical Society*, May.

† A. Meyer proved that the action of the extracts of *Cirsium arvense*, *Oxalis Acetosella*, *Rumex Patientia*, *etc.*, coagulated milk by force of their acidity; while *Cynara Scolymus* (artichoke) and, according to Wittmack, also *Carica papaya* and *Ficus Carica* curdled *per se*.

far as the practically important fact of rapidity of coagulation is concerned. This is not surprising if we consider that a larger quantity of active substance attacks the body upon which it is made to work, over a larger area—attacks it at more points at once. If it were possible to regulate the action of sulphuric acid upon alcohol in a corresponding way, we should doubtless find, within certain limits, a similar relation; the temperature also, at which the rennet acts upon milk is a factor upon which the result depends. The individual character of the milk, and the presence of certain foreign substances added to it, are included in the conditions under which milk will be coagulated by rennet.

Concerning the quantity of rennet with respect to the swiftness of coagulation, Soxhlet's* experiments are of interest. He found that the same rennet and the same milk reacted upon each other in forty minutes, if the proportions were one of rennet and ten thousand milk; but in two minutes and six seconds, if the proportion was one to five hundred. By means of a number of such experiments it was found that the time which it takes to coagulate milk, at the same temperature and in equal quantities, is inversely proportional to the quantity of rennet used. These experiments give us the means of determining analytically the real value or contents of a given rennet extract in active coagulating power, as we shall see later.

It seems that the manufacturers of cheese, at least in this country, do not attribute much value to these facts; they find that a certain amount of rennet is necessary to curdle the milk, and they are satisfied with this.

The maximum power of coagulation lies between +38° and +40° C. A temperature of +70° C. entirely destroys the activity of rennet upon milk.

Concerning the individual character of milk and its influence upon coagulation, it has been found that the relative proportion of casein to water in milk is of the greatest influence. Thus A. Mayer found that milk which coagulated in twenty-five minutes in a jelly-like state, took thirty minutes for precipitation in the same state when 5 per cent. of water was added; it took 36½ minutes, and the precipitate showed a finely flocculent form, when the dilution with water had been increased to 10 per cent., and at 20 per cent. the time was 73½ minutes, and the form of the precipitate was also flocculent.

It is not difficult to understand that if the milk of one animal contains the casein and the calcium salts in a different proportion to water than that of another animal, the coagulation will be accordingly influenced. The reason why a certain apparently normal milk will not coagulate is still unexplained, but it seems to be dependent upon foreign substances contained in the same. As far as the reaction of milk is concerned, it has been found that the coagulation is at its height if the milk reacts acid, lowest when alkaline, and intermediate when neutral.

The foregoing remarks have outlined the peculiar *conditions* under which rennet and milk react upon one another more or less favourably. We now have to approach this reaction itself somewhat more closely.

What is the difference, for example, between skimmed milk, before and after successful coagulation? Before coagulation we had a peculiar uniform liquid containing casein, albumen, peptones, sugar of milk and salts including the important calcium phosphates. After coagulation we have the casein combined (or mixed) with a certain amount of calcium phosphate as a precipitate and the rest of the salts, the albumen, peptone and the sugar of milk constitute the whey. This result was obtained by the addition of a small quantity (1 part) of rennet to, as I will show further on, sixty thousand parts of milk. The immensity of this reaction calls to mind the sudden crystallization of certain salts in supersaturated solutions upon introduction of a minute fragment of the same salt in the solid state, but we see at once that we cannot continue to draw a parallel here. We introduce into the milk a foreign substance, and only certain constituents of the milk are precipitated from sixty thousand times the quantity of the latter in comparison to the former. That milk contains its two most important substances, the fat and the casein, both in a condition from which they are, the former by shock, the latter by rennet, *suddenly* and almost totally precipitated is no doubt an interesting fact. The solidification of the milk fat may well be compared to the above-mentioned crystallization from supersaturated solutions, particularly since my own experiments have satisfactorily proved to me that *milk* churns quicker if butter is added, a fact which I suppose is known also in dairy establishments, but for the explanation of cheese precipitation we have to look for other facts.

To my knowledge the first one who attempted, though unsuccessfully, to obtain the active principle of rennet extracts (rennet) was Deschamps (*Dingler's Polytechnisches Journal*, 1840, No. 78, p. 445). He thought that he had found the real active principle of rennet, to which he gave the name "chymosin." Deschamps' results were tested and contradicted by Dr. Husemann in Chur, who found the chymosin prepared according to Deschamps' method to be nothing but a mixture of the weakest coagulating power possible, and consisting mostly of calcium phosphate and mucous nitrogenous organic substances, so that it could not be the active principle of rennet.

Liebig (*Chemische Briefe*, 1865, page 159), Hallier (*Gahrungserscheinungen*, 1867, page 39) and Soxhlet (*Journal f. praktische Chemie*, vol. 6, page 29 to 38) differed in regard to the peculiarity of the action of rennet.

Liebig, in accordance with his general ideas on fermentation, thought that as soon as a decomposition of the mucous membrane of the stomach had begun, the membrane then had the faculty of transforming the sugar of milk into lactic acid, which would neutralize the alkali which keeps the casein dissolved, thus precipitating this latter.

Hallier thought that only the organisms contained in calf's stomachs were the cause of coagulation and that microbes of *Penicillium* would coagulate milk as quickly as rennet.

In Liebig and Hallier we see also on this subject quite general expressions of the two opposite ideas in regard to the cause of fermentation, characteristic of the period.

Soxhlet's conception was, that the difference between coagulation of milk by means of rennet and spontaneous coagulation was only to be found in the fact that under the influence of rennet it took place more quickly. According to him rennet would transform sugar of milk into lactic acid, by means of which the neutral alkaline phosphate contained in milk would be transformed into the acid salt. If now, consequently, *that* definite proportion between neutral and acid phosphate be arrived at, in which the albuminoid (casein) is just kept in solution at low temperatures, and if then the temperature be raised, the albuminoid would be precipitated even if the liquid showed the alkaline reaction. That the acid reaction was also present was, of course, particularly remarked by Soxhlet.

We see that Soxhlet at that time did not admit a difference between coagulated and precipitated casein. We know to-day that in the first place cheese differs mainly from casein by its insolubility in water in which casein is readily soluble, then by its contents of calcic phosphate.

* Milch-Zeitung, 1877, p. 513.

It seems to me, that of the many excellent investigators of this subject, Olof Hammarsten has pushed the knowledge of milk coagulation by means of rennet farthest, and it was he who for the first time really prepared the "*chymosin*" or "*lab*," as he calls it, in a pure state, particularly free from its companion pepsin. Hammarsten's original report (*Upsala Läkareforenings Förhandlinger*, vol. viii., 1872, pp. 63–86), was not attainable, but I have read an extract of it, in Maly's *Jahresbericht über die Fortschritte der Thierchemie*, 2 vol., 1872 (ed. 1874), page 118, *et seq*. Hammarsten's researches date sixteen years back. He begins by confirming Soxhlet's observations, that normal, new cow's milk reacts almost invariably amphoteric. He then points out that it is of the greatest importance for the study of the process of coagulation, to work with ferment solutions of great strength, so that the coagulation might take place within a few minutes, thus avoiding a formation of lactic acid which will set in after one to two hours, and which would lead to a complex result from which no conclusions could be drawn, as he shows further on. He prepares infusions of the mucous membrane of calf's stomach by means of $\frac{1}{10}$th to $\frac{2}{10}$th per cent. hydrochloric acid, and states that by 1 c.c. of such an infusion, which may have been previously neutralized or even rendered slightly alkaline, 25 c.c. of new milk will be curdled in two minutes at 36° to 38° C. The reason for preparing a solution by means of hydrochloric acid will be given later.

He then made the following experiments:—New cow's milk that had been rendered slightly alkaline by the addition of sodium hydrate was curdled within four to ten minutes by means of an infusion of neutral reaction. The coagulation was complete, so that not a trace of casein could be found in the whey, when tested by means of acids.

The reaction in these experiments was tested from minute to minute, but was not found to have changed either before, during, or after coagulation. It was all the time an alkaline one.

Though these experiments speak in favour of the curdling of milk independently of lactic acid formation, Hammarsten furnished the decisive proof of this in another manner. He prepared casein solutions which were entirely free from sugar of milk. This is done by precipitating from milk, by means of common salt, applied in a powdered state, the fat and casein and a little albumin, leaving the sugar of milk, most of the albumin and salts in the filtrate. The coagulum is washed with a concentrated sodium chloride solution. Then the curd is taken up with water and the butter is separated for the most part by strongly shaking the mixture. A filtration through linen and a new precipitation by means of common salt follows. The precipitate is pressed thoroughly between bibulous paper so as to free it from most of the sodium chloride, then dissolved in water and filtered through linen or filter paper of rather loose texture. Thus a casein solution is obtained which contains casein and fat, but no sugar of milk. This solution remains unchanged in a warm state, but upon addition of some of the ferment solution it curdles exactly like ordinary milk. This experiment succeeds not only with the above-described impure infusion, but also if the perfectly pure ferment, the description of which will follow, is used.

The conclusion to be drawn from these experiments is, that solutions of casein free from sugar of milk coagulate quickly with rennet, exactly as milk does, even with amphoteric or weak alkaline reaction. Therefore the curdling process is a something entirely independent of the formation of lactic acid.

A further proof regarding the non-significance of sugar of milk for the curdling of milk is furnished by Hammarsten by preparing a ferment from the mucous membrane of the calf's stomach, which instantaneously coagulates milk or solutions of casein free from sugar of milk, while it is entirely without action upon sugar of milk alone. For this ferment, which is not identical with pepsin, Hammarsten proposes the name *lab*. It *is* evidently the real chymosin, which Deschamps supposed he had found.

The "lab" shows almost all the same reactions as the pepsin, but since it is easier to destroy lab than pepsin, it is more difficult to get pure lab solutions than pure pepsin solutions.

The method according to which Hammarsten prepared lab solutions, free from pepsin, consists in the first place in a fractional precipitation by means of magnesium carbonate or solution of lead acetate. Both ferments, pepsin as well as lab, are in this way mechanically precipitated, but for some reason it is possible, perhaps because the pepsin is more easily precipitated, to free liquids entirely from pepsin, while a goodly amount of lab remains in solution. Hammarsten thus prepared solutions, which at blood heat coagulated milk of neutral reaction within 1 to 3 minutes, while properly acidulated, they did not peptonize a little pouch of boiled fibrin.

In order to prepare the lab in a pure state, fractional precipitation by means of lead acetate was applied. The pepsin having been almost or entirely removed, lead acetate, with the addition of very little ammonium hydrate, is used for precipitation. The precipitate is decomposed by means of very dilute sulphuric acid and the acid solution, containing mere traces of albumin, is mechanically precipitated according to Brücke's method (used by him for pepsin) with the aid of cholesterin, or by means of a watery solution of palmitin and stearin soap.

The method described yields good results only in case the original infusion was rich in lab. The liquids, diluted with ten times the amount of water, must still be so strong that 1 c.c. will coagulate 5 c.c. of milk at blood temperature in one minute.

The pure lab gives the following reactions according to Hammarsten: it does not show the xanthoprotein reaction; watery solution does *not* coagulate on boiling; it is *not* precipitated by alcohol, nitric acid, tannin, iodine or normal lead acetate, but is precipitated by basic lead acetate. The impure lab on the contrary *is* precipitated by the same reagents.

Alcohol destroys the lab at neutral reaction only slowly. Increase of time of reaction and augmentation of alcohol also increase the amount of lab destroyed.

Fixed caustic alkalies act strongly to decompose lab, particularly at higher temperatures.

The resistance of lab to heat differs with neutral or acid reaction. A solution rich in lab may be momentarily heated to + 70° C., without losing all its ferment, whilst the same solution, acidulated with $\frac{3}{10}$ per cent. of hydrochloric acid loses all its ferment if momentarily heated to + 63° C. or even after heating it for forty-eight hours to + 37° or 40° C. Pepsin on the contrary is not so easily destroyed in acid solutions; we have therefore a comparatively easy means of preparing pepsin solutions free from lab by heating the acidulated liquid for a certain time up to + 40° C.

The only physiological action of lab, according to Hammarsten, is that upon casein, which it coagulates at neutral, acid, or alkaline reaction. The effect appears latest in alkaline solution, and a small excess of alkali is sufficient to destroy it altogether. The best action is obtained in acid solution, and it was shown by controlling experiments that acid to that amount *alone* would not be the reason of coagulation.

The addition of certain salts (as we have seen above) retards or even stops a coagulation altogether.

Sugar of milk is not changed by lab into lactic acid, nor is albumin digested by it.

(*To be concluded.*)

The Pharmaceutical Journal.

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1888.

STANDING on the threshold of a New Year, the tendency often is to attempt to peer into its secrets, or at any rate to speculate as to its probabilities, rather than to go back over the ground trodden in the previous twelve months. Now-a-days, indeed, when so many of our contemporaries, having the gift of prescience, foretell the end from the beginning—with the single slight drawback that, as a rule, they are wrong—the *rôle* of prophet is not likely to be left long unfilled. In the absence, therefore, of any special qualifications for playing that part, it may be at least as useful, if less ambitious, to recall in more or less connected order some of the events affecting pharmacy that were crowded into the year 1888. The phrase "pharmaceutical politics" conveniently describes the group of events to be dealt with first, those which may have affected the relations that the members of the pharmaceutical commonwealth seek to maintain among themselves and towards the public. So far as these relations have statutory expression in Great Britain they are to a large extent entrusted to the supervision of the Executive of the Pharmaceutical Society; the constitution of that body should therefore be a subject of primary interest to everyone interested in pharmacy in this country. The conditions under which it is elected are such as to make it readily amenable to the wishes of the electors, and if at any time it should be less representative of registered chemists and druggists than it might be it must be the fault of those who neglect the opportunity afforded them of influencing the policy of a craft organization that has hardly a parallel among the guilds of the country. So far, however, as may be judged from the indications afforded by the last election, there is no pretext for pretending that the Council has not the confidence of the majority of those who take an active interest in the welfare of their calling, since the only changes that it has undergone in its membership during the past twelve months have been due to resignations. Mr. RADLEY, after serving eleven years as a member of Council, and Mr. G. S. WOOLLEY, after serving ten years, declined nomination for a fresh term, and Mr. N. H. MARTIN, of Newcastle-on-Tyne, and Mr. A. NICHOL were in May elected to the vacancies. The other twelve gentlemen who offered themselves for re-election were all returned. Subsequently, in October, Mr. H. B. BAILDON, who had also filled the office of Chairman of the Executive Committee of the North British Branch, having intimated that he was unable to continue his services, the Council chose as his successor Mr. WATT, of Haddington, whilst the Chairmanship of the North British Committee was taken by Mr. W. GILMOUR, of Edinburgh. At the June meeting of the Council, Mr. MICHAEL CARTEIGHE was chosen President for the seventh time in succession; Mr. T. P. GOSTLING was succeeded as Vice-President by Mr. ALEXANDER BOTTLE, who held the same office three years in 1873-1876; and Mr. J. ROBBINS was asked to continue the services as Treasurer that he commenced in 1880.

Again a year has passed leaving the amendment of the law relating to pharmaceutical education unachieved. The new Bill which was approved by the Council last February embodied several alterations intended to meet some of the objections that had been urged against the previous Bill when it came before the House of Commons. One of the most important of these alterations had reference to the case of persons who had been engaged in the practice of pharmacy in the dispensaries of hospitals and other public institutions of a like nature, where it was to be presumed that ample opportunities would be afforded for technical training and for acquiring the practical experience requisite to qualify for passing the Minor examination. Recognizing the justice of this view in regard to properly conducted dispensaries, the Council decided to introduce into the Bill a provision that they were to be included among the places in which candidates for qualification as pharmacists must have been practically engaged for not less than three years. Another alteration of minor importance was the provision that in the event of the Bill passing into law it was to be construed as one with the Pharmacy Act, 1852, wherein the limitation of the subjects for examination to purely pharmaceutical bearings is specifically defined. This was introduced mainly to dispel a misconception that had strangely enough arisen as to the possible extension of the teaching of "materia medica" so as to include therapeutics and the use of drugs in the treatment of disease. Apparently the unfounded apprehension underlying the opposition offered to the Bill on that ground was in itself to be regarded as evidence of the evil resulting from the vague manner in which the subjects of therapeutics and pharmacognosy are too often dealt with in this country under a loose application of the term materia medica. It would seem to be only a crass confusion of these two subjects that could suggest any objection to the study of drugs by persons

intending to practise as pharmacists. However, the only apparent grounds for opposition to the Bill on behalf of interests outside the scope of pharmacy were entirely removed by the above alterations, and as regards the conditions within that range it was a satisfactory sign of progress that the opposition to the Bill previously offered by members of the Society had been very materially withdrawn. So much was that the case that the motion for the adoption of the amended Bill was seconded by Mr. HAMPSON who had in the earlier stages of the discussion taken a position adverse to the establishment of an enforced curriculum. But though external opposition and internal difference of opinion as to the adoption of more efficient and systematic constraint for the improvement of pharmaceutical education were thus to a great extent done away with, and though the Bill introduced into the House of Lords by the Earl of MILLTOWN in February was read a third time and passed during the following month, its progress in the more turbulent atmosphere of the Lower House was less successful, and towards the close of the autumn session it was finally dropped, after having undergone numerous postponements. Notwithstanding the fact that the Pharmacy Act Amendment Bill of last session passed the House of Lords without opposition, it underwent in committee a very unexpected and important amendment, and that at the hands of the noble lord who introduced the Bill. After moving that the Bill be taken in committee, and after the first clause relating to educational matters had been agreed to, his lordship mentioned that it had been quite recently brought to his knowledge that chemists and druggists not unfrequently had branch shops which were entrusted to the management of unqualified assistants. His lordship considered that practice to be a practical evasion of the clear intention of the Legislature, as expressed in the Pharmacy Act of 1868, objectionable from every point of view, and constituting not only a serious danger to the public, but also no small hardship for qualified men who, having gone through a due course of technical training, might find their places occupied by persons who had no qualification for nor right to them. Adopting the view that individual qualification was unquestionably the chief aim of the Pharmacy Act, Lord MILLTOWN therefore moved as an addition to the second clause of the Bill that it should be unlawful for a duly qualified keeper of an open shop for retailing, dispensing or compounding poisons to keep open shop in more than one place, unless he engaged at each branch shop a person duly qualified on his own account, by having, in fact, as good a qualification as the actual proprietor; and he proposed that there should be a penalty of five pounds for every breach of this provision. This very unexpected development of the legislation sought for by the Society in regard to purely educational regulations was a cause of much surprise, even to those who did not regard the proposed amendment as objectionable in itself, and it serves to illustrate forcibly the possibilities that may be latent in an application to the Legislature for amendment of the law and what dangers might be incurred by seeking legislative regulation of matters relating to trade interests. It is still more instructive in that respect to follow the tendencies of the discussion upon Lord MILLTOWN'S motion. The purport of the remarks made by Lord CRANBROOK and Lord HERSCHELL on that occasion is especially worthy of note, for it distinctly shows that they were under the impression that the existing law requires every chemist and druggist's shop to be in the actual charge of a qualified person, and both agreed that if any other construction than that were possible, the existing law was, from their point of view, much in need of alteration. Lord HERSCHELL went even further than that, and held that no person should be allowed to dispense who has not the legal qualification, and he held that to be the only provision which would give security to the public. But though the attempts of the Council to obtain amended legislation have so far ended in failure, it is satisfactory to note that the enforcement of the existing Acts has been carried out with beneficial results. During the year upwards of one hundred and fifty warnings have been addressed to persons ascertained to be infringing the Pharmacy Act, with the effect that in the majority of cases that step has been sufficient to secure a cessation of the practices complained of, while in only a few cases was it necessary to have recourse to legal proceedings for recovery of the penalties.

Cases of poisoning have in the past year been more than ordinarily numerous, chiefly by reason of the fact that there have been so many instances in which carbolic acid has been taken accidentally or with suicidal intent. In Liverpool there has been a kind of epidemic of carbolic acid poisoning of such magnitude as to command the special attention of the local authorities, by whom letters were addressed to the Council of the Society, and to the Privy Council, urging that steps should be taken for preventing a recurrence of such misapplications of carbolic acid, and for suitably restricting its sale. Last October the subject was brought under the notice of the Council by Mr. SYMES in a motion reiterating in regard to carbolic acid the resolution which was passed some years ago by that body, in pursuance of the powers conferred upon it by the Pharmacy Act, and communicated at that time to the Privy Council. The opinions expressed in the discussion upon Mr. SYMES'S motion were unanimously in favour of proper precautions being observed in the sale of carbolic acid, in order to prevent the numerous cases of accidental poisoning that occur from neglect of labelling, etc., and

the resolution that was then passed was sent to the Privy Council, with a letter stating that as the large and increasing number of deaths from poisoning by carbolic acid had been so repeatedly pointed out by Coroners and others, it was considered necessary to deal with this matter separrately, and again to ask the Privy Council to approve the resolution that carbolic acid should be included in the poison schedule. The reply was that the subject would be further considered; but as yet nothing has been done. At the October meeting of the Pharmaceutical Society of Ireland this subject was also brought forward, and in conformity with the course ineffectually taken with regard to it on a previous occasion, it was resolved once more to urge upon the Privy Council the desirability of adding carbolic acid to the poison schedule. During the autumn session of Parliament Mr. PICTON asked the Home Secretary whether his attention had been called to the numerous cases of poisoning by carbolic acid, and whether the Government intended to take any action in this matter for carrying out the recommendations of the Council of the Pharmaceutical Society. The reply given was to the effect that the resolution passed by the Council was still under consideration, but that there were difficulties in the way of approving the Council's resolution, since "skilled opinion" was not altogether favourable to the views expressed. So the matter rests at present; but it is not easy to conceive what can be the nature of the "skilled opinion" adverse to the resolutions of the two bodies which are by law entrusted with the duty of deciding such a question by reason of their special competence to do so, neither does it appear what adequate reasons there can have been for allowing a question so pressing to remain "under consideration" for some six years, without even any communication as to the difficulties which interfered with the approval of two resolutions affecting the public safety.

Another subject brought before the Council by Mr. SYMES in reference to poisons was the proposal that the Council should recommend the members of the Society to adopt, and submit to the Privy Council for approval, regulations for keeping, selling and dispensing poisons under the provisions of the Pharmacy Act, 1868. When this motion came before the Council it was resolved to take it in committee, and as Mr. SYMES declined to enter upon the discussion of the subject under that condition the motion dropped. Probably therefore the less that is said about it now the better. But it may be pointed out that there was, at the time, a very widespread feeling that as the Society in general meeting had very decidedly disposed of the question as to poison regulations in 1871, it would have been *ultra vires* for the Council, as the Executive representing the Society, to reopen the discussion of a question that had been fully considered and decided upon.

During the past twelvemonths a total number of 2604 candidates have presented themselves for the examinations prescribed by the Pharmacy Acts; in the previous year the number was 2552. The increase of 52 was distributed over the whole of the examinations, except the Modified, which remained stationary, and the total was made up as follows: Major, 117; Minor, 1091; Modified, 3; and Preliminary, 1393. Of the Preliminary candidates, 733, or 52·6 per cent. satisfied the examiners, which was nearly exactly the same proportion as in the previous year; but in addition 98 certificates from recognized examining bodies were received in lieu of passing the Society's examination. So that notwithstanding the deprecatory reports to be heard on every hand as to the inadequacy of the return from the practice of pharmacy to the sacrifices which it entails, there were no less than 831 persons who during the year took the first step towards obtaining the necessary qualification, being the highest number in one year since 1883. The passes in the qualifying, or Minor examination, also maintained the high standard of the previous year, the successful candidates having numbered 510, or 46·7 per cent., being exactly the same proportion as in 1887. But with certain declamations, green in the memory, against the tyranny of attempting to regulate the studies of those intending to present themselves for this examination, it will not be out of place to recall the figures published a few weeks since, showing that in Prussia, where a strict curriculum is prescribed for the pharmaceutical student, the proportion of passes was not 46, but 91 per cent. Of the 117 persons who presented themselves for the Major examination, 66 passed, being a higher number, but rather lower proportion than in the preceding year. Before leaving this subject, reference must be made to the recent removal by death of Dr. GREENHOW, who for a period of twenty years had performed the important duty of Visitor on behalf of the Privy Council to these examinations, with independence, but yet in evident sympathy with those who controlled and carried them out. His report on the examinations in 1887, presumably the last from his pen that will be published, was communicated to the Council in March. It was, as usual, commendatory in tone, and it expressed a hope that an amended Pharmacy Bill, enabling the Pharmaceutical Society to prepare new bye-laws, might be passed during the then current session of Parliament. Dr. THOMAS STEVENSON has, it is understood, been appointed as successor to Dr. GREENHOW in this office.

The decision taken by the Council in August to abandon the five months' courses in the School of Pharmacy and to revert practically to the ten months' course, was entirely in accordance with the decided development of opinion in recent years in favour of thorough education. Even in respect to the pre-pharmaceutical training this has been

manifest, in the many suggestions that have been made to the effect that the scope of the Preliminary examination should be extended. The growth of this feeling will no doubt be favoured by the wider range of subjects covered by the university local examining boards and other bodies whose certificates are now received in lieu of this examination, to which has now been added the Scotch Education Department, with its "leaving certificates."

The Research Laboratory, which had for some time previously been in process of organization by a Committee, came in a definite form under the consideration of the Council at the commencement of the year, upon a motion that the sum of £300 a year for three years should be granted for expenses incurred in pharmaceutical research under the superintendence of the Professor of Chemistry and a Committee and that a laboratory should be fitted up in the new building for the purpose at the cost of not more than £300. After discussion this motion was carried and the valuable contributions to pharmacology that have already been the outcome of the researches by Professor DUNSTAN and his co-workers have been referred to in another column.

The Annual Meeting of the Pharmaceutical Society was held in May and was fairly well attended, and the Report of the Council, which contained no very special features, was after the usual free criticism unanimously adopted. Subsequently, a motion, of which notice had been given, was brought forward by Mr. BROAD, to the effect that the Council should appoint a person whose duty it should be to obtain information and report to the Registrar all cases of infringement of the Pharmacy Act he might discover. Mr. BROAD failed, however, to carry the meeting with him and the proposition fell through. As usual a Conversazione was held in connection with the annual meeting, but instead of resorting to South Kensington Museum, the Council invited the members and associates to a reception in the Society's premises, so as to afford an opportunity for inspecting the new examination hall and the research laboratory. The invitation was not very numerously responded to, but those who did avail themselves of it were prodigal in their admiration of the beauty and substantiality of the new building. In the evening of the day of the annual meeting a large number of the members and friends of the Society dined together at the Freemasons' Tavern.

The Benevolent Fund, which occupies so large a share of the attention of the Council, received during the year 1888 the sum of £1500 3*s.* 6*d.* in subscriptions, being nearly £30 in excess of the income from the same source in the previous year. The donations amounted to £182, which, of course, showed a great falling off, the sum of the previous year's donations having been swelled by the gifts in connection with the decennial dinner. The total income, therefore, apart from interest on investments, was £1682 3*s.* 6*d.* On the other side, the expenditure in annuities exceeded that of any previous year, amounting to £1705, and the casual grants, which were rather below the average, reached £395. It will therefore be evident that if the expenditure of the Fund is to continue at this high level, persevering exertions will have to be made to secure the necessary income, and the Council will have to depend, as in previous years, upon the valued co-operation of the Local Secretaries. It will be remembered that recently Mr. T. C. W. MARTIN suggested a systematic canvas of the chemists and druggists of London on behalf of the Fund, and invited suggestions as to the best means of carrying it out; but up to the time of writing there has been hardly any response to this invitation. In December three fresh annuitants were elected, bringing the total number of persons now in receipt of annuities from the Fund up to fifty-two.

The Evening Meetings of the Society in London have been well maintained; several of the papers read have been of exceptional interest, and some of them have been from the Society's newly established Research Laboratory. The titles were as follows:—"Note on Sandal Wood Oil," by Mr. P. MACEWAN; "The Study of the Principles of Elementary Mechanics in a Pharmaceutical Curriculum," by Mr. E. CULLINAN; "Cocaine and its Salts," by Dr. B. H. PAUL; "The Identification of the Chinese Bark Hwang-Peh," by Mr. P. W. SQUIRE; "Note on Striated Ipecacuanhas," by Mr. F. RANSOM; "The Preparation of Ethyl Nitrite," by Professor DUNSTAN and Mr. T. S. DYMOND; "Chemical Observations on Tartar Emetic," by Professor DUNSTAN and Miss L. E. BOOLE; "Note on Two Resins used by the Ancient Egyptians," by Mr. E. M. HOLMES; "Introduction to a Series of Contributions to the Chemistry and Pharmacology of the Nitrites of the Paraffin Series," by Professor DUNSTAN; "On Iso-butyl Nitrite," by Professor DUNSTAN and Mr. E. J. WOOLLEY; "The Metameric Amyl Nitrites," by Professor DUNSTAN and Mr. W. L. WILLIAMS; "The Chemical Constituents of Amyl Nitrite used in Medicine," by Professor DUNSTAN and Mr. E. J. WOOLLEY; "Comparative Effects of Spiritus Ætheris Nitrosi and Solution of Nitrite of Ethyl," by Professor D. J. LEECH; and a "Note on the Effect of Amyl-Nitrite," by Dr. T. L. BRUNTON and Mr. T. J. BOKENHAM. The October meeting was, as usual, devoted to the reception of reports from the Professors and the distribution of prizes to the successful students of the previous session, which was followed by an admirable address, delivered by Sir HENRY ROSCOE. Before the company separated the opportunity was taken to present to the Society a portrait of Professor BENTLEY, which had been painted at the expense of the subscribers to a testimonial fund, and to hand over to the Professor a purse

containing a cheque for a handsome sum, as a token of respect and good will from his old students and friends.

The number of attendances in the Society's Library in London has shown a marked improvement as compared with the previous year, the total number in the daytime having been 6372, or an increase of 1425, and in the evening 1703, or an increase of 140. The circulation of books has been also larger by 500 entries, the number for the town having been 1797 and that for the country 1709. During the year 316 volumes and pamphlets have been added to the previous collection. In Edinburgh also the library has been well used and several additions of books have been made. The edition of the catalogue of the two libraries issued at the commencement of the year was rapidly exhausted. A new edition has therefore been prepared and is now ready for delivery.

The interest taken both at home and abroad in the Society's Museum, shows no sign of flagging. No less than three hundred specimens have been presented by the Director of Kew Gardens during the year. A valuable series of rare chemicals has been received from the Fabbrica Lombarda di Produtti Chimici at Milan. Mr. A. Ferrein, of Moscow, has contributed excellent specimens of a new asafœtida plant; Mr. J. G. Prebble, of Bombay, a series of Indian medicinal plants; Messrs. Burroughs and Wellcome, an interesting series of specimens illustrating the manufacture of lanolin; and Mr. F. Harwood Lescher has from time to time forwarded rare or curious drugs appearing in the London market. Mr. J. C. Hart has presented a number of excellent microscopic slides of drugs, and Dr. Dymock, Mr. D. Hooper, Messrs. Schimmel and Co., and many other firms and private individuals have contributed to increase the importance of the very large and valuable collections now in the possession of the Society. The total attendance in the Museum during the year was 5124 in the day and 856 in the evening.

The North British Branch of the Pharmaceutical Society, represented by the Executive Committee, has continued to exercise its useful functions. At the meeting in June, Mr. H. B. Baildon was re-elected Chairman of the Committee, and upon his resignation subsequently, Mr. W. Gilmour was elected to fill that office. Evening Meetings of the Society have been held in Edinburgh as usual, at which the papers read have been—"Note on Extractum Ergotæ," by Mr. D. Gorrie; "Syrupus Hypophosphitum Compositus, B.P.C.," by Mr. W. Lawson; "Syrupus Ferri Phosphatis Compositus, B.P.C.," by Mr. W. Lawson; Various Notes on the B.P.C. Formulary; "Note on Hygrine," by Dr. R. Stockman; "Morphine Hydrate," by Mr. D. B. Dott; "German Methylated Spirit," by Mr. D. B. Dott; "Note on a Species of Astragalus from Cyprus," by Mr. J. R. Hill; Note on the Deposit occurring in Decoctum Scoparii," by Mr. J. H. Fisher; "Notes on Ipecacuanha Wine," by Mr. C. A. Macpherson; "Report on Acetic Extract of Ipecacuanha," by Messrs. Thomson and Duncan; "Liquor Strychninæ Hydrochloratis and other Official 1 per cent. Liquors," by Mr. C. A. Macpherson; "Note on Syrupus Ferri Hypophosphitis," by Mr. G. Lunan; "Cows' Milk: a probable Source of Danger," by Mr. A. Gibson; and a "Note on Chromate Iron Ore from Shetland," by Mr. A. Sutherland. In addition, an Inaugural Address was delivered by Mr. Gilmour, at the opening of the new session in November.

In Ireland the Council of the Pharmaceutical Society, like the similar body in Great Britain, has been largely occupied in an attempt to get a Bill passed by a much occupied Parliament, and it also has failed. This Bill, which was introduced into the House of Lords rather late in the session, had for its object to provide for the registration of those "druggists" whose right to sell poisons, but not to dispense medicines, was reserved under the Act of 1875, and also for the registration, after passing a "modified" examination, of persons who had commenced to carry on that business since 1875; also to prohibit any other than registered persons from dealing in poisons. This registration was to be made dependent upon the payment of certain fees, and was to be continuous only upon the condition that the druggist should remit to the Registrar every December a fee of half a guinea. A similar provision for the payment of a yearly fee was meant to apply to pharmaceutical chemists who are not members of the Pharmaceutical Society of Ireland. It also required that a registered person carrying on the business of a pharmaceutical chemist or druggist should give it his personal supervision, or in his absence employ a qualified assistant. The Bill met with considerable opposition from persons concerned, and was referred to a Select Committee, which inserted several new clauses, and among them one to the effect that the registered druggist should display a notice that he was not licensed to dispense medical prescriptions. In this form the Bill passed the House of Lords; but in the House of Commons it met with renewed opposition, which delayed its progress until in the last days of the adjourned session, notwithstanding the withdrawal by the promoters of most of the points objected to, the Bill had to be abandoned At the annual general meeting of the Irish Society, in June, it was stated that the membership showed a slight advance on the previous year, and Mr. James E. Brunker was re-elected President and Mr. Draper Vice-President. At the first meeting of the new Council a resolution was passed recommending that carbolic acid should be included in the poison schedule.

Concerning other Societies in which British phar-

macists take more or less interest, it may be mentioned that the British Pharmaceutical Conference met in Bath in the early part of September, under the presidency of Mr. F. B. Benger, who introduced the business proceedings with a very practical and instructive address. The British Association met in the same city immediately afterwards under the presidency of Sir F. J. Bramwell. The Society of Chemical Industry met in June in Glasgow, and there gave its members an opportunity of visiting the admirable exhibition then open in that city. Abroad, the German Pharmaceutical Association held its annual meeting in Berlin, and the American Pharmaceutical Association met in Detroit. The International Pharmaceutical Congress which was expected to have been held in Milan did not take place, and although there appears some possibility that it will be held some time in the current year, up to the present no official information has been received as to the arrangements.

The year has not passed without serious losses by death to science in general and pharmacy in particular. At a comparatively early age Professor De Bary, of Strassburg, has passed away, but not before he had, by his biological researches, permanently influenced the teaching of botany throughout the world. On the other side of the Atlantic the same science has lost, in Professor Asa Gray, a votary whose studies rather applied to the classification of plants. Dr. Peter Griess had contributed materially to the progress of organic chemistry, but he had also applied his scientific knowledge to the carrying out of a technical industry. Professor Clausius was a physicist, who had raised a scientific landmark in his work on the mechanical theory of heat. The Pharmaceutical Society lost two of its Honorary Members, Dr. Edmund Headlam Greenhow, who for nearly twenty years attended the Society's examinations on behalf of the Privy Council, and Dr. Frederick Porter Smith, whose association with pharmacy came through his work upon Chinese materia medica. Mr. Richard Raimes was for many years a member of the Council of the North British Branch and at one time its President; Mr. David Kemp also filled the same office, and for many years acted as an examiner in Scotland. Four local secretaries have also been removed by death in Mr. Henry Roberts Cornish, of Penzance; Mr. Richard Morgan Davies, of Carmarthen; Mr. John Hunter, of Gosport; and Mr. Thomas White, of Launceston.

Turning now from politics to the more or less technical and scientific events of the year, these are found to furnish almost an *embarras de richesse* for the recorder to select from. Many new drugs have been described, several old ones have been the subjects of more complete investigation, and the pharmaceutical processes by which new and old drugs alike are brought into condition suitable for administration have been the subject of a number of unusually good papers. The careful revision by Mr. E. M. Holmes of the group of plants capable of yielding asafœtida has served to throw further light on this, comparatively speaking, imperfectly-known section of the Umbelliferæ. He has shown that although we have as yet actual evidence of the production of asafœtida from *Ferula fœtida*, Regel, and *Ferula alliacea*, Boiss., only, yet there are several other species which probably furnish a portion of the commercial gum resin. In the course of his inquiries he has been able to point out that the appearance of *F. Narthex*, as grown at Kew, is, when in fruit, different from the figure given in 'Medicinal Plants;' that *Ferula fœtidissima*, Regel, is not identical with *F. Jaeschkeana*, Vatke, as stated in the 'Flora of British India;' and lastly, that *Ferula rubricaulis* can no longer be considered to be a source of galbanum, since it has an alliaceous taste, which galbanum does not possess. He suggests that it may, however, possibly afford sagapenum. Better material for determining the botanical source of star anise has led to the conclusion that the plant from which it is derived must be placed in quite a different section of the genus from that including *Illicium anisatum*, the plant to which star-anise has been referred by Bentley and Trimen; that in fact it is a new species, which has now been described by Sir Joseph Hooker under the name *Illicium verum*. Some cultivation experiments have also been initiated with a view to obtaining a definite form of *Aconitum Napellus*. Mr. Kirkby has supplied the data for discriminating with the aid of the microscope between Dalmatian insect powder from *Chrysanthemum cinerariæfolium* and Persian powder from *C. roseum*. But probably the drug about which as much temporary interest has centred as any is gum, on account of the abnormally high price reached by gum arabic through the stoppage of supplies from the Soudan. Numerous gums from India and America have been experimented with, as well as gum substitutes, but the gap has only very partially been filled by the best of them.

A useful contribution to previous knowledge of an important drug has been made by Mr. F. Ransom in determining the alkaloidal value of some of the so-called "striated ipecacuanhas." A root corresponding to the "small striated ipecacuanha" of the 'Pharmacographia,' supposed to be derived from a species of *Richardsonia*, as well as a sample of the "large striated ipecacuanha" (*Psychotria emetica*), proved to contain only traces of emetine, and they have been both stigmatised as comparatively useless as substitutes for the true drug. The root of *Cephaelis tomentosa*, also, which is not annulated like its congener, but bears shallow striæ, was found to contain only a minute quantity of emetine. Quite

recently it has been reported that ipecacuanha contains a volatile base that has hitherto escaped notice. Early in the year Dr. SQUIBB stated that the jalap coming into the United States market since 1870 had contained a low proportion of resin, so that it was rare to meet a specimen answering to the U.S.P. requirement that it should contain 12 per cent. of resin. Subsequently, Mr. R. A. CRIPPS reported upon thirty-four samples of jalap, in seven of which the resin exceeded the U.S.P. standard, and from the general results it would appear that just now the quality of jalap in the English market is rather better than that reaching the United States. It has also been reported from Japan that the purgative properties of the seeds of *Pharbitis triloba*, like those of *Pharbitis Nil*, are due to a resin which presents all the characters of convolvulin, the resin of jalap. The fruit of *Embelia ribes*, which enjoys the reputation in various parts of India of being a good anthelmintic, and also enters into the composition of native remedies against ringworm and other skin diseases, has been examined by Dr. WARDEN, who has separated from it an acid that he has named "embelic acid" and represented by the formula $HC_9H_{13}O_2$. The ammonium salt, which is crystalline, is said, in three grain doses for children and six grain doses for adults, to have proved effective in the removal of tænia, and as it is tasteless it seems worthy of further trial. Another Indian drug, the bark of *Rhamnus Wightii*, in repute on account of its tonic, astringent and deobstruent properties, has been examined by Mr. HOOPER, who found it to contain several principles similar to those that have been observed in other medicinal barks of the same genus, but most closely resembling those in the bark of *Rhamnus Purshiana*. This last-mentioned bark, known also as "cascara sagrada," has itself been the subject of an interesting paper by Messrs. MEIER and WEBBER, who in addition to the constituents reported by previous writers, have observed the presence of an unorganized ferment, precipitable by subacetate of lead, and it is to the development of lactic acid in the stomach by that agent that they ascribe the unpleasant effects sometimes following the administration of a preparation of the fresh bark. A similar ferment occurs in *Rhamnus Frangula* bark, and the conversion of chrysophan into chrysophanic acid in rhubarb has been attributed by KUBLI to a like agency. Messrs. MEIER and WEBBER affirm that there is a remarkable difference in the action of cascara sagrada and that of frangula bark, in that the former exerts a distinctly tonic influence, which they refer to a bitter principle developed from the crystalline glucoside present in it, first described by Professor WENZELL, the laxative action being due to the resins, and especially to a brown resin that occurs in larger quantity in aged than in fresh bark. The glucoside and the resins are all devoid of bitterness, but under the influence of acids the glucoside is decomposed, setting free an intensely bitter substance, and it is through the influence of the acid developed by the ferment, rather than the direct action of the ferment, that the normal decomposition of the glucoside is effected. As the resins form soluble compounds with the alkalies and alkaline earths, and the tasteless glucoside is capable of being decomposed by the acids in the stomach with the separation there of the bitter tonic principle, it would seem possible to prepare comparatively tasteless extracts that should contain all the elements capable of developing the tonic and laxative effects of the drug, and consequently "tasteless" preparations have made their appearance and were the subject of discussion at the Conference meeting. According to Herr SCHWABE the glucoside of *Rhamnus Frangula* bark is frangulin, which splits up into emodin and sugar. But he failed to obtain any glucoside at all from fresh "cascara sagrada," or even from a fresh frangula bark, so that it is evident the last word upon this subject has yet to be spoken. *Cassia Tora* seeds also have been credited by Mr. ELBORNE with a glucoside of this class, which on account of the manner of its decomposition he regards as "potential emodin." Wild cherry bark is another drug that appears to be influenced by the action of a ferment, since contact of it with water gives rise to a development of benzaldehyd and hydrocyanic acid. After a careful investigation, Messrs. POWER and WEIMAR have come to the conclusion that the bark does not contain crystallizable amygdalin, but an analogous substance possessing a somewhat bitter taste and amorphous, and that the ferment is not identical with emulsin or synaptase. The peculiar bitter principle of the bark is said to be a crystalline fluorescent glucoside. The seeds of *Eugenia Jambolanum*, which under the name "jambul" have recently been recommended in the treatment of diabetes, have been examined by Mr. ELBORNE, but the investigation revealed nothing that would account for the therapeutic action attributed to the drug. The bark of *Michelia Nilagirica*, which is considered in India to have febrifugal properties, has been examined by Mr. HOOPER, who obtained from it volatile and fixed oils, an acrid resin, tannin, a bitter principle, starch and mucilage, but nothing to account for the reputed action. In the previous year the bark had been reported to yield a "very aromatic essential oil," but the oil separated by Mr. HOOPER hardly corresponded with this description, and it appears now that the bark giving rise to the report had been erroneously named. Michelia bark possesses the property of decolorizing iodine solution which is characteristic of cinnamon and cassia barks, but it is distinguishable from them by its odour. Another bark yielding a useful essential oil having recently been referred to under the

name "massoy bark," concerning the application of which considerable confusion exists, Mr. HOLMES has given reasons for holding that the true massoy bark is derived from *Sassafras Goesianum* and not from *Massoia aromatica*, to which the bark worked upon was rightly or wrongly attributed. Still another Indian drug has been examined by Mr. HOOPER, with very interesting results. The leaves of *Adhotada vasica* are used as an expectorant and antispasmodic, and they are also smoked for the relief of asthma; but they are also scattered by agriculturalists over recently flooded fields prepared for the rice crop, on account of the property they are said to possess of killing aquatic weeds that would otherwise be injurious to the rice. The most important constituents that were separated were an organic acid, named "adhatodic acid," and an energetic base, "vasicine," which occurred in the leaves in a soluble form, probably as adhatodate of vasicine. This alkaloid appears to act as a rapid poison towards the lower animal and vegetable organisms, for leeches, and even a frog, were killed within an hour by the addition of a solution of the sulphate to water containing them. An aqueous solution of the alcoholic extract also acted as a powerful insecticide. The resemblance in therapeutic action between quillai bark and senega has been explained by Professor KOBERT, who states that they each contain an acid and a neutral glucoside—the former quillaic acid and sapotoxin and the latter polygalic acid and senegin—and that the two pairs of compounds, though not identical, are very closely allied. The stem and branch bark of *Punica Granatum* have been ascertained to contain about one-third of the alkaloid present in root bark. Besides the foregoing a number of interesting definite principles have been reported upon during the year as having been obtained from other vegetable drugs. Among the alkaloids may be mentioned "grindeline," from *Grindelia robusta*; "anagyrine," from *Anagyris fœtida*, or "false senna;" "grandiflorine," an energetic poison, from *Solanum grandiflorum*; "calycanthine," from *Calycanthus glaucus* bark, or "Carolina allspice;" "piperidine," from peppers; "lathyrine," from *Lathyrus sativus*; "imperialine," from *Fritillaria imperialis*; and "anhalonine," from *Anhalonium Lewini*, which is credited with remarkable physiological properties. Of the glucosides, one of the most interesting is "ouabin," which has been obtained from the wood of an apocynaceous tree yielding an arrow poison to the Somalis. This compound has a composition represented by the formula $C_{30}H_{46}O_{12}$, and an examination of crystalline strophanthin from the seeds of *Strophanthus hispidus* gave results agreeing with the formula $C_{31}H_{48}O_{12}$, indicating that the compounds were homologous, whilst comparative physiological experiments showed their action to be identical in kind, though differing in degree. A variety of "strophanthin" differing in some respects from the strophanthin of *S. Kombé* seed is reported to have been obtained from the seeds of *S. glabrus*. Other interesting observations are that the leaves of the yellow-flowered *Digitalis ambigua* yield compounds identical with digitalin, digitalein, digitoxin and digitonin, whilst a glucoside obtained from the common snapdragon (*Antirrhinum majus*) has been identified with rhinanthin, a body similar to digitalin. "Ophioxylin" is a crystalline compound, that has been separated from the root of *Ophioxylum serpentinum*, and seems to represent the tænicide properties of the root. "Arganin" is a crystalline bitter principle, separated from the argan nut.

The alkaloids have, as usual, given rise to a large number of valuable papers. The cinchona alkaloids have however proved less prolific in this respect than for some time past, though M. JUNGFLEISCH has discovered so many isomers of cinchonine that he has been driven to laying half the letters of the alphabet under contribution to provide for them distinctive names. Atropine, which was long considered to be the characteristic base of henbane, is now alleged by Dr. WILL to be a product of the modification of hyoscyamine effected by the agents used in its extraction, and Professor LADENBURG has expressed the opinion that atropine, which is optically inactive, will turn out to stand in relation to hyoscyamine as racemic acid does to lævotartaric acid. In addition to previous sources, hyoscyamine has been observed in the German *Scopolia atropoides*. Physostigmine has been reported by Herr EBERS to be one of the most readily detected of alkaloids, giving a perceptible precipitate with the double iodides when so minute a quantity as one-thousandth of a milligram is present, or a colour reaction through conversion into rubreserine when a drop of solution containing that quantity is brought into contact with potash solution. He has also called attention to another alkaloid accompanying physostigmine in the Calabar bean, and into which physostigmine is also convertible by treatment with sulphurous acid. This compound, which has been named "eseridine," and represented by a formula indicating that it has the composition of physostigmine plus the elements of a molecule of water, is claimed to exercise a laxative action without disturbance of the cerebral nervous system, and as not being cumulative like strychnine. The view that colchicine is a methyl ether of colchiceine has received confirmation by the artificial production of one from the other by treatment of colchiceine with methyl iodide. But it was observed that during the operation, besides colchicine, dimethylcolchiceine or methylcolchicine was formed, exactly as a dimethyl compound is said to be formed in the analogous conversion of morphine into codeine. Berberine has been reinvestigated by Mr. W. H. PERKIN, who confirms the identity of the hemipinic acid resulting

from its oxidation with that derived from narcotine. Commercial narceine, according to Messrs. CLAUS and MEIXNER, always contains small quantities of other substances, which can be removed by careful oxidation with potassium permanganate, and the pure crystalline narceine so obtained is said to be greatly improved in therapeutic value. Morphine has been the topic of several papers, most of them having regard to its water of crystallization. In a paper read before an evening meeting of the Society in Edinburgh, Mr. DOTT announced that, contrary to the statements current in text-books, morphine hydrate loses all its water of crystallization at a temperature below 100° C., and that this may take place as low as 90° C. From the results of numerous experiments he had also arrived at the conclusion that the normal amount of water of crystallization in this compound is in excess of molecule for molecule, and represented it by the formula $8C_{17}H_{19}NO_3$, $9H_2O$. Notwithstanding, however, the tendency towards complexity in this instance, Mr. DOTT, in another paper, written in conjunction with Dr. STOCKMAN, has objected to the doubling of the ordinary formula for morphine, as proposed by Dr. WRIGHT. The loss of all the water at the lower temperature was subsequently confirmed by Dr. HESSE from his experience, but he challenged the accuracy of the complex formula suggested as representing the composition of crystallized morphine. Dr. HESSE also pointed out another erroneous statement current in standard works to the effect that the melting point of morphine is a little above 120° C., his own experience being that it does not melt much below 230° C. A very delicate test for the presence of morphine has been described by Mr. J. L. ARMITAGE, depending upon the formation of TURNBULL'S blue, when a morphine solution is treated with ferric chloride and then with potassium ferridcyanide. This was attributed by Mr. ARMITAGE to the reduction of ferric chloride by the morphine ; but Dr. HESSE states that there is a formation of pseudomorphine ferrocyanide, to the reaction of which with ferric chloride the blue coloration is due. Some further information respecting the chemistry and pharmacology of the morphine derivatives was also communicated to the Pharmaceutical Conference by Messrs. DOTT and STOCKMAN. Early in the year, erythrophleine, the alkaloid of *Erythrophlœum judicale*, was put forward as a local anæsthetic, comparable to cocaine. The circumstances attending its introduction were rather uuusual and led to a warmth of disputation strongly in contrast with the indifference that now obtains respecting the compound. Considerable progress was made during the year in chemical knowledge of the coca alkaloids. The general question of the state in which cocaine and its salts occur in commerce was dealt with exhaustively in a paper read by Dr. PAUL at an evening meeting of the Society in March, in which reference was made to the impurities resulting from the amorphous bodies accompanying cocaine and from the ready decomposability of the alkaloid under certain conditions in its extraction from the leaves. It was shown that the quality of commercial specimens varied very much, and the opinion was expressed that the salt was frequently supplied at a price too low to admit of its purity. Dr. PAUL recommended that the hydrochloride should be prepared from the purified crystalline alkaloid obtained from ether or alcohol solutions, and that MACLAGAN'S method should be adopted for testing its purity. In the course of the discussion that followed the reading of the paper instances were given of symptoms following the administration of cocaine that seemed to find a probable explanation in the impurity of the samples used. One of these impurities appears to have been separated by Professor LIEBERMANN from the mixture of amorphous bases obtained as a bye-product in the preparation of cocaine from coca leaves. It proved to have the constitution of a cocaine in which the radical of benzoic acid is replaced by an isomer of isatropic acid, and was therefore named "isatropylcocaine." This compound has been tested physiologically by Professor LIEBREICH and found to act as a strong poison, probably giving rise to the symptoms observed when impure cocaine has been used. Cinnamylcocaine, another possible constituent of the amorphous mixture, but not yet separated, has been prepared synthetically. Incidentally, this subject has furnished another answer as to the *cui bono* of chemical research. Cocaine, it is known, has been proved to be methyl-benzoyl-ecgonine, and the principal of the bases accompanying it have been ascertained to resemble it in containing an ecgonine nucleus easily separable by treatment with acid. With this knowledge it has now become practical to utilize economically the former bye-product of amorphous alkaloid, and to build up from the ecgonine, either by introducing the benzoyl group first and then the methyl, or operating in the reverse order, a cocaine that is not distinguishable from the natural alkaloid. Several allied compounds have also been obtained by substituting some other group for either the methyl or benzoyl radicle. Hygrine, the volatile base which was formerly stated to hold cocaine in solution, and thus constitute "amorphous alkaloid," does not seem to have been the subject of any remark by Professor LIEBERMANN, in describing his experience with the amorphous material upon which he worked, but Dr. STOCKMAN has reported that he has succeeded in obtaining hygrine from fresh coca leaves in relatively large amounts, and found it to be a very powerful irritant. Dr. WARDEN has described a "cocatannic acid" obtained from Indian-grown coca leaves, and he has also reported that he has found the percentage of alkaloid

in the Indian leaves to exceed published assays of leaves from any other source; but the importance of this statement is much diminished by the admission that this "cocaine" does not apparently form crystalline salts. The announcement that a new base had been extracted from tea leaves created some interest, and within the last few days Herr KOSSEL has announced that this "theophylline" is a dimethylxanthine, isomeric with but differing from theobromine and paraxanthine, and possibly identical with a compound prepared artificially by STRECKER thirty years ago.

The chemical laboratory has also contributed to the materia medica its quota of home-made chemical compounds, as distinguished from the active and inactive principles it has isolated from more or less crude drugs. One of the most interesting of these is anthrarobin, a compound obtained by Professor LIEBERMANN in the attempt to reduce chrysophanic acid to chrysarobin. The reaction that took place was a simple replacement of oxygen by hydrogen, unaccompanied by the fixation of the elements of water, and the product, represented by the formula $C_{15}H_{12}O_3$, contained less of both elements than is present in chrysarobin. It proved, in fact, to be one of a group of "leuco" bodies obtainable by the reduction of colouring compounds of the anthraquinone group. As all these bodies readily undergo reoxidation by atmospheric air, and as it was upon a similar property that the action of chrysarobin in skin diseases was supposed to depend, the reduction products of alizarin and flavopurpurin, to both of which the name anthrarobin has been given, were prepared and tested physiologically and clinically. Anthrarobin was found by Dr. WEYL to exercise no action on the living organism, it being excreted in the urine unaltered, whilst chrysarobin is oxidized under the same conditions to chrysophanic acid. Its effects in the treatment of psoriasis and other skin diseases have been reported on favourably, the action being described as somewhat inferior to that of chrysarobin and more intense than that of pyrogallic acid. From a similar point of view hydroxylamine (NH_2HO) has been suggested as a substitute for chrysarobin and pyrogallic acid in skin practice, presenting the advantage over both of not staining the skin. Hypnotics have been reinforced by the addition of sulphonal, which is obtained by the action of mercaptan upon acetone and the oxidation of the sulphur in the resulting condensation product to form diethylsulphon-dimethyl-methane $(SO_2C_2H_5)_2{\cdot}C{\cdot}(CH_3)_2$, or methane in which the hydrogen has been replaced by ethylsulphon and methyl. This compound does not seem to act promptly as a narcotic, but rather to favour the restoration of normal periods of physiological sleep. Another compound, in which one of the hydroxyls of chloral hydrate is replaced by amidogen, trichloramidoethylic alcohol ($CCl_3{\cdot}CH(NH_2)OH$), has been suggested under the shorter name "chloral-ammonium," as probably possessing the best qualities of urethan and chloral, free from the objectionable action of the latter in paralysing the respiratory centre and heart. Methylal also has been reported to have been found useful when injected subcutaneously in cases of delirium tremens. The chemical antipyretics have again been productive of a large quantity of literature, the scientific flavour of which has not unfrequently been affected by a "dash" of trade interest. Antipyrin has increased in favour, though it has failed to make good the claims put forward as to it being a remedy against sea sickness. Some little attention was attracted to the green precipitate formed sometimes when antipyrin is prescribed with spirit of nitrous ether; but it is now pretty well understood that this is due to a characteristic reaction with nitrous acid, and that the coloured compound is not poisonous, as was at first supposed. Phenacetin, besides continuing in use as an antipyretic, is now prescribed frequently for the relief of neuralgic affections. Antifebrin, or acetanilid, still maintains its place, and the analogous benzanilid has also been reported to be useful. Quite recently, under the name "pyrodin," another compound has been introduced, acetylphenylhydrazine ($C_6H_5{\cdot}N_2H_2{\cdot}C_2H_3O$); but although it appears to possess remarkable power to reduce the temperature, its liability to produce toxic symptoms have called forth urgent warnings in the medical journals that it should be used with great caution and only in cases of extreme urgency, when other antipyretics have failed.

Oil seeds and oils, fixed and volatile, have received an unusual amount of attention. Ricinine, the alkaloid said by TUSON to occur in castor oil seeds, but the existence of which has been denied, has been reported by Mr. BECK to be separable from the leaves, root, and stem of the plant, and Dr. STILLMARK has attributed the toxic effects of castor oil seeds when eaten to an "unformed" ferment that he has named "ricin." The fatty acids of castor oil have also received further description, as also the oil from the seed of *Jatropha Curcas*, whilst the examination of the oils from a number of leguminous seeds showed that some of them contained cholesterin and lecithin. Margosa oil, expressed from the almonds of the nim tree, and regarded in India as a valuable remedial agent, has been re-examined by Dr. WARDEN, who separated from it an alkaloid, a resinous principle containing sulphur and two acid resins. The increasing use of cotton-seed oil for the adulteration of olive oil and lard has led to several suggestions for its detection, among which may be mentioned those depending upon the reduction of silver nitrate and gold chloride by the adulterant. Cod liver oil has yielded to Messrs. GAUTIER and MOURGUES a number of bases, especially "aselline" ($C_{25}H_{32}N_4$) and "morrhuine" ($C_{19}H_{27}N_3$), which are said to be powerful

physiological agents, the latter being credited with representing the diaphoretic and diuretic properties of the oil. They have also separated another body, "morrhuic acid," possessing the properties of a base and an acid. It may be questioned, however, how far some of these bodies are constant constituents of cod liver oil, or how far they may be the products of decomposition. Herr MARPMANN, too, has announced the discovery in liver oils of a body similar to one occurring in the pancreas, which has the property of rendering fixed oils miscible with water to an extraordinary degree. On the other hand the assimilability of cod liver oil has been attributed to the presence of free acid, and on this basis a cod liver substitute has been introduced under the name of "lipanin," said to consist of olive or cotton-seed oil mixed with a little free fatty acid. The continued investigation of the constitution of essential oils has tended further to reduce the number of their constituents, and show that some of them, as for instance, eucalyptol, occur in several other oils than the one after which they are named. Lastly, a number of essential oils have been distilled from novel materials and reported upon by Messrs. SCHIMMEL.

The greater importance attached in recent years to antiseptic methods of treatment, both in medicine and surgery, continues to influence the multiplication of antiseptic remedies. Mercurial compounds alone have been the subject of an unusually large number of communications, most of them relating to the combination of powerfully antiseptic organic compounds with the metal or its salts. Mercury-phenol, or hydrargyrum carbolicum oxidatum, has been mentioned in the reviews of previous years, but the reference has been to a basic compound represented by the formula $Hg \cdot OC_6H_5 \cdot OH$. This is said to have been difficult to obtain of constant composition, and in its place has been recommended a crystalline compound containing two phenylic equivalents and represented by the formula $Hg \cdot OC_6H_5 \cdot OC_6H_5$, for the preparation of which a process has been described. POUCHET has pointed out that if, instead of heating metallic mercury with phenol, mercuric chloride be used, the compound formed has a composition represented by the formula $(C_6H_5O)_2Hg,Hg_2Cl_2 \cdot 4H_2O$. Analogous compounds are formed when cupric chloride is used in the place of mercuric, or when β-napthol or α-anthrol is substituted for phenol, and such compounds having been found to be relatively non-poisonous, they would seem to have possible future in medicine. Mercury salicylate ($C_7H_4O_3 \cdot Hg$) is a similar preparation that has been recommended for internal administration and external use. When a concentrated hot solution of this compound is mixed with one of caustic soda in equivalent proportions a double salt is formed containing both mercury and sodium; but when sodium chloride is used the salt formed is said to be repserented by the formula $C_6H_4\langle^{COO—Hg—Cl}_{ONa}$, in which the mercury is in combination with both the chlorine and the salicylic radicle. This compound is soluble in water containing sodium chloride, and has therefore been suggested to replace mercuric chloride as an antiseptic dressing. Mercuric succinimide, obtained by dissolving mercuric oxide in succinimide, like it, does not precipitate albumen, and has therefore been recommended for hypodermic administration, as also has a suspension of "thymol-mercury" in liquid paraffin. Mercury amidopropionate, or alanin mercury, made by saturating a boiling solution of amidopropionic acid with mercury, is another compound that has been put forward as an antisyphilitic suitable for hypodermic medication. Mercury cyanide is reported to have yielded remarkable results in the treatment of diphtheria in Sweden, and both the cyanide and oxycyanide, besides being well tolerated by the tissues on account of their slight absorbability, have been alleged to exercise an aseptic power equal, at least, to mercuric chloride. Of the other antiseptics that have been the subject of communications during the past year, sozoiodol has had its chemical constitution more completely elucidated. It now appears that the "difficultly soluble" variety of sozoiodol is the acid potassium salt of diiodparaphenolsulphonic acid, $C_6H_2I_2\langle^{OH}_{SO_3K}$, and that the soluble variety is the corresponding sodium salt of the same acid. Both compounds, therefore, contain a larger proportion of iodine than was at first supposed. The neutral potassium salt is also very soluble, and several compounds of the acid with other bases have been described. A compound of phenol with bromine, "tribromphenol," which is formed upon the addition of bromine water to a solution of carbolic acid, has been spoken of as possessing remarkable antiputrescent properties. A high place among the group of antiseptics has been claimed for α-naphthol on the ground that whilst possessing remarkable antiseptic powers, it is relatively non-poisonous. Either α-naphthol or β-naphthol is said to combine with camphor to form a syrupy liquid that is superior to a mixture of carbolic acid and camphor because it is more powerfully antiseptic whilst less poisonous. Oxynaphthoic acid has been attributed a more powerfully antiseptic action than either salicylic or carbolic acid, and it has been suggested that it might be administered internally as an antipyretic, but it is admitted that unless strongly diluted or protected with mucilage it is liable to give rise to strong local irritation. Carbonaphtholic acid, obtained by acting on naphthol with carbonic acid in the presence of sodium, is another powerful antiseptic that has been recommended, but which appears to possess somewhat poisonous properties. Resorcin has been reported

to have proved valuable in controlling severe diarrhœa, the offensiveness of the motions having been at once decreased, and a similar disinfecting action has been observed to follow the internal administration of cocaine in cases of typhoid. Quinine hydrofluosilicate has also been recommended for its antipyretic and antiseptic properties. As might be expected, sulphur compounds have had their advocates, the hyposulphites having been strongly recommended as a means for combating hydrophobia, and aluminium "persulphite" and "hyposulphite" having been described as non-poisonous and unirritating antiseptics.

Coincident with the development of antiseptic therapeutics, greater attention is being paid to the general subject of the ferments. Besides the instances already referred to of ferments occurring in plants, other instances have been met with in the Jerusalem artichoke, the latter having the property of changing inulin, but not starch, into sugar. Professor Green has drawn an interesting parallel between the animal and vegetable ferments, and remarked that the occurrence of vegetable ferments in those parts of plants which are specially connected with reproduction seems to point to a possible function in connection with the storage of proteid food material for the nutrition of the embryo during germination. Diastase from wheat has been found by Herr Lintner to contain the same proportion of nitrogen as diastase from barley malt, and appeared to him to correspond in respect to its fermentative properties. But whereas he found the action of wheat diastase to be intensified by a strong solution of sodium chloride, Herr Kiawkow has reported that he found the fermentative action of barley malt diastase to be retarded by sodium chloride. Agave juice and tissue have been reported as capaple of effecting the complete conversion of meat fibrin into peptone in five or six hours. The technical importance of this subject finds another illustration in the observation that the addition of mercuric iodide to tanning liquors, by preventing the loss of tannin through fermentation, increases the leather-producing power of a given quantity of raw material. Mr. Duncan has recorded the interesting observation that ferric chloride is reduced to ferrous salt in contact with pepsin, pancreatin, and other ferments, a point not without importance in therapeutics. In addition, as being closely connected with this subject, the observations of Mr. Warington upon the chemical action of micro-organisms may be referred to here. Different species showed great diversity of action. Some appeared to cause the curdling of milk by the production of lactic acid, others by the formation of a rennet-like ferment; some developed alkalinity in a liquid, others acidity; some reduced nitrates to nitrites, others oxidized nitrites to nitrates.

The communications from the new Research Laboratory of the Pharmaceutical Society upon the organic medicinal nitrites constitute an important contribution to the chemical side of pharmacology, but they have so recently been referred to in detail in these pages as to necessitate only a brief reference here. The first communication was upon ethyl nitrite, in which Professor Dunstan and Mr. Dymond described a convenient method of preparing this compound in a pure state by the reaction of sulphuric acid with sodium nitrite and alcohol at a low temperature, as well as a fairly stable solution of it. This solution of pure ethyl nitrite has been tested comparatively with the official spirit of nitrous ether by Professor Leech, who has reported that he finds no difference in the therapeutic action of the two liquids. Amyl nitrite, B.P., formed the subject of another investigation, during which it was ascertained by Messrs. Dunstan, Woolley and Williams that the official preparation is a varying mixture, containing, besides α- and β-amyl nitrite, isobutyl nitrite and other substances, and the results of subsequent physiological experiments by Professor Cash and Dr. Brunton seem to indicate that the isobutyl nitrite is the most active constituent. From the same source came a paper on tartar emetic, by Professor Dunstan and Miss Boole, in which the official method of testing the salt was criticized and the substitution of the hydrated salt by an anhydrous compound obtained by the precipitation of a strong aqueous solution of tartar emetic with spirit was recommended. Many other papers giving the results of the chemical and physical examinations of articles of the materia medica have also appeared. In one of them, Messrs. Ewell and Prescott confirm the statement made by Mr. J. Williams in 1878, that artificial salicylic acid may contain acid bodies differing from the salicylic acid prepared from oil of wintergreen, they having detected in ordinary commercial samples 15 to 20 per cent. of homologous acids, calculated as hydroxytoluic acid. Mr. Gerrard has given his experience as showing that "citrate of caffeine" has not the solubility attributed to it in the Pharmacopœia. Mr. Hawkins has called attention to the difference in solubility of samples of "dried magnesium sulphate," due to the varying quantity of water left in them; he has also noted the occasional occurrence of ferrous salt in solution of perchloride of iron. The frequent presence of carbonate in zinc oxide has been affirmed by Mr. Thornton, who found in six samples quantities ranging from 4 to 21 per cent. There have also been several good papers on analytical processes, among which may be mentioned Mr. Saul's on urine testing, Mr. Arnold's on the present position of toxicology, Mr. Millard's on water analysis, and a note on the detection of strychnine by Mr. Cripps.

Finally, the past year has been very productive of good pharmaceutical communications, and there have been several excellent ones upon general pro-

cesses. Among these may be mentioned those on the dispensing of mixtures and lotions, by Mr. INCE; the preparation of concentrated infusions, by Mr. WILSON; extraction by pressure, by Dr. SYMES; concentration at low temperature, by Mr. LLOYD; some hints on filtration, by Mr. BIRD; and a paper on the use of paper pulp for that purpose. The British Pharmaceutical Conference has issued a second edition of its useful Unofficial Formulary, and from the much more inclusive National Formula of the United States a number of selections have been published in this Journal. The question whether the minimum size of a pill containing a small quantity of an active substance should be one grain or two grains, raised in this Journal by Mr. INCE, developed into a general discussion at the Conference without any definite decision being arrived at, though the preponderance of expressed opinion was in favour of the smaller size. Numerous formulæ for tablets and pastils were given in a paper by Mr. WYATT, and several new iron preparations have been described by Herr DIETRICH. In the preparation of spirit of nitrous ether, Mr. FARR has shown that a product richer in ethyl nitrite may be obtained by adopting more effective means of condensation. Preparations of ipecacuanha have afforded their usual contribution, and the papers on the preparations of the phosphates and hypophosphites have been too numerous to allow of their being epitomized here so as to fairly represent their practical value. A process for the preparation of liquid extract of ergot without heat has been devised by Mr. GORRIE, and Mr. HUSBAND has pointed out that ergotin made by the official process may vary according to what the operator understands to be a syrupy consistence, or, in other words, that the quantity of water left in the extract when the rectified spirit is added will affect the nature of the resulting precipitate. The deposit that occurs in tincture, and especially infusion of senega, has been attributed by Mr. HILL to the gradual formation of sapogenin from the splitting up of saponin. The deposit that forms in freshly prepared decoction of broom has been found by Mr. FISHER to consist of scoparin, which can be redissolved by the addition of a little potash solution. Mr. ROTHER had stated that the property possessed by yerba santa of covering the bitter taste of quinine is due to the eriodictyonic acid it contains forming a tasteless compound with the alkaloid, and Mr. QUIRINI has now separated and described the acid and recommends its use in the preparation of quinine pastilles. Another material for covering the nauseous taste of medicines that has been strongly recommended is an elixir of black currant. Many more papers have appeared that are well worthy of mention, but enough has been said to show that the past year, although not all that could be wished from a material point of view, was not an unfruitful one in the development of pharmacy and the allied sciences. May the coming year attain at least the same standard!

We are requested to state that in consequence of the first Wednesday in the month falling at such an early date the Council Meeting has been postponed until next week. We may also mention that the next Evening Meeting of the Society will not be held until February, of which due notice will be given, as usual.

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The next meeting of the School of Pharmacy Students' Association will take place on Thursday, January 10, when Mr. C. B. Bell will read a paper on "Sir Humphrey Davy," and Mr. F. Browne will give a Report on Analytical Chemistry.

Transactions of the Pharmaceutical Society.

EVENING MEETING IN EDINBURGH.

The second evening meeting in Edinburgh of the present session was held in the Society's House, 36, York Place, on Wednesday, December 26, at 8·30, Mr. William Gilmour, F.R.S.E., in the chair. The minutes of last meeting having been read and adopted, the following communication was read:—

COW'S MILK: A PROBABLE SOURCE OF DANGER.

BY ADAM GIBSON, F.C.S.

A few years ago I had occasion at different times to examine the water supply of the small town at which I was located. An epidemic of typhoid fever having broken out in the town, and this fever being frequently attributed to an infected water supply, I was asked to assist in the investigation with a view to trace the source of the outbreak.

Knowing that the town water was fairly good, it was concluded that nothing would be gained by an inquiry in this direction, and so it was resolved to look elsewhere for the probable cause.

It being ascertained that all the cases of typhoid occurred in families who obtained their milk supply from a certain dairy, this fact seemed to give a clue as to the direction in which to proceed, as there have been many instances in which epidemics of typhoid have been attributed to contaminated milk.

This contamination has been accounted for in many ways. The most common explanation has been that, either from animal excreta finding its way into the water, or from typhoid poison being present in the water used for washing milk utensils, the typhoid poison is introduced into the milk, where it rapidly increases and infects the whole supply.

It has also been attributed to cases of typhoid occurring among inmates of the house where the milk is stored, the infection being conveyed to the milk either through the air, or by the hands of those who nurse the fever patient and also handle the milk utensils. In this case, however, neither of these explanations could apply. There was no known case of fever in the house at the time of the outbreak, and the water used in the dairy for cleansing purposes was the ordinary town supply which, as I have already indicated, was above suspicion. Some other cause had therefore to be sought for.

Inquiry was then made as to the sanitary arrangements of the byre, and the feeding of the cows. As to the former, everything was satisfactory, the byre being capacious, well-arranged and clean. It was found that the cows were grazing on a piece of waste land, through which lay the old bed of a river.

In order to understand the circumstances, it may be well to explain that about two years before, in connection with an improvement scheme, the original course of the river was diverted in a straight line

leaving the old channel in the shape of a semi-circle, and it is to this semi-circle I refer as forming a part of the area on which the cows were grazing.

This old river bed formed a pool of stagnant water, and was moreover a free toom for all kinds of rubbish, including dead cats and dogs. This stagnant pool was the only available water supply for the cows while out grazing, and this fact at once suggested the desirability of an examination of the water, or rather the liquid contained in the pool.

It was found that the solid matter, consisting largely of decaying animal and vegetable matter, amounted to 52 grains per gallon, and an estimation of the ammonia gave 0·87 parts parts free ammonia and 1·36 parts albumenoid ammonia in a million. This, as you will perceive, is pretty highly charged with organic matter, and indicates that the pool was in a filthy condition.

This being the only water to which the cows had access, there can be no reasonable doubt that they drank of it, and therein may lie the source of the typhoid epidemic. It was proved that only those persons who had partaken of the milk were attacked, and all the circumstances seemed to point to the fact that from drinking this filthy water the cows were affected with a communicable disease which assumed the form recognized as typhoid in the human subject, and that it was transmitted directly through the agency of the milk.

The subject of the relationship between milk supply and certain fevers has recently attracted a large amount of attention, and the above case throws an entirely new light on the generally recognized connection between milk supply and typhoid epidemics.

This theory has since been confirmed in a communication read at last meeting of the British Medical Association by Mr. Wm. Brown, F.R.C.S., of Carlisle (*British Medical Journal*, Aug., 1888, p. 413), who points out that in a similar epidemic in Carlisle, which had been traced to the milk supply, the cows suffered from a febrile disorder, having a very striking resemblance in its symptoms to human typhoid, and that this, and not, as is generally alleged, the water used for washing the dairy utensils was the cause of the Carlisle epidemic.

He does not account for the febrile disorder in the cows, which may have been caused by want of proper sanitary arrangements in the byre, or, as in the case I have described, by the cows drinking water highly charged with decomposing organic matter.

Might I suggest that this source of danger is not provided for by any existing system of dairy inspection, and emphasizes the importance of guarding against all probable sources of contamination outside, as well as inside, the byre and dairy.

The Chairman said this communication, though short, dealt with a point of very general interest and importance. He had often had doubts as to the safety of grass from meadows irrigated by sewage being used as a food for cows. They had a good example of that near Edinburgh, and he had always felt it best to avoid getting his milk supply from dairies in which such feeding was used. It was probable that under ordinary circumstances and with due care there might not be much danger, but in dry, warm weather when there was no rain to wash adhering matter into the soil, and the grass was cut shortly after the ground had been flooded by sewage, some disease germs might remain on the grass and induce disease in cows. Great care was required to avoid contamination of water supply. He had been asked to investigate a case in which the water in a recently constructed well was found to be highly charged with decomposing organic matter. The explanation was that the well had been sunk within 20 feet of the Union Canal, the filthy contents of which had drained into it. In another case an illness among some dairy cows was attributed to their having drunk the water from a well sunk for the purpose of providing them with a supply. This water was also found to be quite unfit for drinking. The well was situated at the bottom of a hollow into which the sewage from the farm had drained. He thought it a very probable thing that the milk of cows might be contaminated in the way suggested by Mr. Gibson.

Mr. J. B. Stephenson said he had listened with much interest to this short paper, which indicated the necessity of looking for sources of danger outside as well as inside the byre and dairy. As to the top-dressing in the sewage meadows referred to, he did not think there should be much danger, as the decaying matter would be completely destroyed by exposure before the grass was cut. He thought this subject was fully discussed in Edinburgh some years ago, and the conclusion then come to was that the use of such grass was not in any way dangerous. From another point of view, however, these sewage irrigation meadows were a public nuisance, as anyone might prove by taking a walk along the shore road between Leith and Portobello. Some time ago he had been consulted in a case where the water supply in a field had become charged with offensive matter and caused illness in stock drinking it. It was found that the water had drained off a field on which a large number of sheep had been fed on turnips, and apparently the source of the contamination was the sheep manure with which the soil had been saturated.

Mr. Boa said he thought Mr. Gibson had brought forward a very good case in support of his theory, and he did not think it had ever been proved that milk might not become infected in the way he suggested. On the other hand, it might be expected that the elaboration process involved in the production of milk would eliminate any poison present in the water, and contamination of the milk would not thus take place unless the cows were suffering from disease. He was inclined to think the grass from sewerage irrigation meadows was innocuous. Such grass was very largely used in Edinburgh, and yet an epidemic of typhoid was a very rare occurrence in the city.

Mr. Macpherson said this case was a strong point in favour of Mr. Gibson's theory that the drinking of filthy water induced a febrile disorder in the cows, and that the poison passed into the milk. As to the danger in using the grass referred to by the Chairman, he thought there was little to fear, as the irrigation system depended on the principle that the whole of the organic matter passed into the soil, and the grass produced therefrom was perfectly harmless. Considering the almost universal use of such grass for dairy cows in Edinburgh, he doubted if the Chairman could be certain that his milk supply was always what he wanted.

Mr. Arthur said this communication was of interest to those who had to do with cattle, and especially dairy stock, and emphasized the importance of securing a supply of pure and wholesome water for drinking purposes. He did not think the theory mentioned in the paper as to the water used for cleansing dairy utensils being the source of contamination was probable, as all such water was boiled before use. He had recently spoken to a veterinary surgeon who was inclined to think that the use of sewage meadow grass might induce disease in cows and affect their milk. Reference had been made to the extensive use of this grass in Edinburgh, and there might be a connection between this fact and the tuberculosis which was very prevalent among cows in the city. It was a fact well known to sheep graziers that if a pasturage was overstocked, there was danger that the soil would become saturated with manure, which became the source of intestinal and liver diseases among the sheep.

Mr. Hill said the case described by Mr. Gibson was an important contribution to the discussion on the relationship between certain communicable diseases and

milk supply, which had recently attracted a good deal of attention. The report presented to Parliament recently on milk supply and scarlatina seemed to leave the question still unsolved, and recent investigations pointed to the probability of milk from a tuberculous cow producing the same disease in the human subject. The fact that outbreaks of scarlet fever and also typhoid were so frequently traced to the milk supply raised a strong suspicion that the milk itself was at fault and contained the germs of disease as it came from the cow. The whole discussion showed the importance of a knowledge of veterinary pathology to those who had to treat such diseases in the human subject.

Mr. Gibson, in reply, said some questions raised had been answered in the course of the discussion. With regard to what was said by Mr. Arthur, he stated in the paper that the current theory was that the source of contamination of milk with typhoid was the water used to cleanse the milk utensils. He had mentioned that to show that it could not apply to this case, but that, on the contrary, the cleansing water was faultless, and the fault lay in the milk as it came from the cow.

On the motion of the Chairman, a cordial vote of thanks was awarded to Mr. Gibson with acclamation.

Mr. Hill then gave a brief description of some recent additions to the Museum, which were exhibited, and drew attention to a donation of Chromic Iron Ore, from Mr. Alexander Sutherland, Unst, Shetland, with regard to which Mr. Sutherland had supplied the following interesting statement:—

Note on Chromic Iron Ore from Shetland.

BY ALEXANDER SUTHERLAND.

In some text-books of chemistry occur the words, "Chromium is found in the state of oxide, in combination with iron oxide in Shetland." I heard recently of the way in which Unst "chromate" became known. About 40 years ago chrome ironstone was both rare and dear. At that time most of the common salt used in Shetland came from Liverpool, and the sloops which brought it went back in ballast. A gentleman resident at Baltasound, Unst, observed chrome ore on the beach, and immediately set about turning the discovery to advantage. The ballast for the sloops always cost a few shillings for loading and discharging. This gentleman started to dig the ore secretly during the night time, and having made an arrangement with a friend in Liverpool, the plan was carried out as follows: He offered to supply and load the sloops with ballast *free* and to discharge it again at Liverpool *free*. This meant a saving of a few shillings each journey to the owners of the sloops, and the arrangement was at once adopted and proceeded successfully for some time. On one occasion, however, a sloop put in at one of the intermediate ports, and, having prospect of a cargo, the captain took the sloop outside the harbour and tipped the whole of the innocent-looking ballast overboard. When he reached Liverpool the ballast was wanted by the consignee, but there was none forthcoming. A dispute arose, as the captain did not consider himself responsible for the ballast, and in the row that was raised it leaked out that chrome ore could be got in Unst. The place got a little fame, and digging went on briskly until it was discovered that the ore could be imported at less cost from some of the Baltic ports. The export of Unst ore then ceased, and, with the exception of a small cargo sent to Glasgow last summer, none has been exported from this island for several years.

On the motion of the Chairman, a vote of thanks was awarded to Mr. Hill, and also to Mr. Sutherland for his donation and interesting note.

Provincial Transactions.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

A supper, held under the auspices of the Midland Counties Chemists' Association, took place at the Colonnade Hotel, New Street, Birmingham, on Friday evening, December 18. Mr. G. E. Perry, F.C.S., President, occupied the chair, and there was a large company present.

The loyal toasts having been honoured, the President gave "The Pharmaceutical Society." He remarked that it was mainly through the instrumentality of the Pharmaceutical Society that pharmacists could hope to get their grievances remedied. The Society had done good work in the past, and it would be the fault of chemists and druggists themselves if it did not continue to do that good work in the future.

Mr. A. Southall replied. He expressed the hope that the Society would be better supported in the future than in the past. The organization, he said, had spent a great deal of money in London, and in some quarters it was stated that the money was to a considerable extent wasted. He, however, thought that as yet the country had hardly had time to pronounce a definite opinion as to whether there had been waste or not. But something was being done. A few weeks back papers were read showing the work which had been in progress in the research laboratories, chiefly by Professor Dunstan and two or three others. The Professor had been working on nitrites, and with the assistance of some of our leading medical men had done excellent work. At one of the meetings at the laboratory speeches were delivered by Professor Michael Foster, Dr. Lauder Brunton, Dr. Armstrong and Professor Saunderson. Some of those gentlemen had taken part in experiments with the nitrites. They had shown, he thought, that the proper way of making spirit of nitre was from ethyl nitrite, and the advantage chemists would gain was, that instead of being summoned for selling an impure article, they would able to sell a pure article. Then the examination hall would be found by students much more comfortable than that in which examinations were previously held.

Councillor Barclay proposed "The Midland Counties Chemists' Association." He said all trades and professions had their organizations, and he thought above all that chemists had a necessity for organization and sympathetic union. The various Acts of Parliament they had to work under were such that it required men of great skill to proceed with their business vocations without being in some way entangled in the meshes of the law. They had Lord Campbell's Act, the Adulteration Act, and the Pharmacy Act itself. With all these regulations, it was difficult for them to carry on their business without molestation. The trade of the chemist was passing through a great crisis just now, and there was never more necessity for trade organization than at present. The Association had had a chequered career. It was a fresh departure, but one which he thought augured well for future success, that the Society was associated with such an Institution as Mason College. They could develope the educational tendencies of the Association much better now that its home was at the College, and he looked forward to the time when chemists would have a professor's chair filled at the College with a professor who would be a fit companion for Professor Tilden, Professor Hillhouse, and the other gentlemen who adorned the chairs of the Institution. Pharmacists should strive to improve their professional status. When they saw the high position which pharmacists held in Germany and France, and saw the magnificent institutions which existed there for the development of pharmacy, and the protection of pharmacists, it encouraged them and

gave them cause for hope. The profession of pharmacy in this country, as a profession, was comparatively of recent date. They had made great progress, and had no reason to be dissatisfied.

The President responded. He said he did not think the Association had much cause for lamentation. Certainly the younger Associations,—the Chemists' Assistants' Association and the School of Pharmacy Association, were more active, as they had on their side the energy and ambition of youth. But comparing their Association with provincial organizations of a similar character, he considered it had held its own. He agreed with Mr. Barclay that there never was more necessity for organization than at present; never was union more needed, and never were their resources more required to assist them to hold their own amidst the thickening strife which was waxing fiercer year by year.

Mr. Thompson (Hon. Sec.) responded. He pointed out that the Association had shown a determination in dealing with the leading questions of the day affecting pharmacists, which had not been surpassed by any similar society in the provinces. In some of these cases satisfactory results had followed. Amongst the cases taken up were the citrate of magnesia case, the Shepperley case, the Irish Pharmacy Act, the new Adulteration Act, the Patent Medicine Act and the Pharmacy Act Amendment Bill.

Mr. Alcock (Hon. Sec.) also replied.

The toast of "The President" was then given, and the proceedings soon afterwards concluded. Songs and recitations were given by several members in the course of the evening.

Parliamentary and Law Proceedings.

Poisoning by "Chlorodyne Lozenges."

On Wednesday Mr. A. W. Wyatt held an inquest at Camberwell, relative to the death of Thomas H. Seppings, aged three years, son of a police constable, of 95, Waterloo Street.

Mrs. Emily Seppings, the mother, said that on Sunday morning she left her bed to prepare a meal for her husband, who was on duty, and she left the child in the bedroom with another young child. After attending to her household duties she returned to the bedroom, and found that there was a peculiar colour about the child's face. She went for a doctor, and a medical man returned with her to the house. He said the child was about to go into convulsions, and he prescribed accordingly. Later in the afternoon the child became worse, and witness sent for the doctor again. In the meantime, she had discovered that a tin box containing chlorodyne lozenges, which had been placed in a drawer in the room, had been tampered with, and that out of between eighteen and twenty-four lozenges, there was only half a lozenge left. When the doctor arrived the second time, she told him she thought the child had eaten the lozenges in mistake for sweetstuff. The doctor made a further examination of the child, but the little sufferer died before anything else could be done.

Dr. F. Horton Villanueva, of the Terrace, Peckham Road, said that when sent for the second time he found the child was in a state of coma, induced by narcotic poisoning, and death ensued shortly after. He was informed of the disappearance of the lozenges, and he had no doubt the child had eaten them, and that had caused his death. He had examined the remaining half-lozenge, and found that it was composed of morphia, Indian hemp, and prussic acid—three of the most deadly poisons; and, in his opinion, these lozenges and other patent medicines were sold in a most reckless manner. Patent medicines were in several cases mainly composed of these poisons, and in many instances there was no warning on the bottle or box. He thought there should be some restriction on the sale of patent medicines, and that no quantity should be sold without a warning placed firmly on the bottle or box.

The father here said that the lozenges were given him by a friend because he had a cold, and he had no idea that they were poison.

A juryman asked the doctor if he thought that all patent medicines were harmful.

The doctor said no doubt patent medicines were very efficacious at times; but if taken in large quantities they were more likely to kill than cure.

Some of the jurymen said they quite agreed with what the doctor said, and they thought Parliament should impose some restriction on the sale of such medicines.

The Coroner said he also agreed with the remarks which had been passed, and he hoped the press would take the matter up.

A verdict of death from narcotic poisoning was then returned.—*Standard.*

Obituary.

Notice has been received of the death of the following:—

On the 9th of December, Mr. Charles Thomas Hammond, Chemist and Druggist, Falsgrave, Scarborough. Aged 55 years.

On the 11th of December, Mr. William Warhurst, Chemist and Druggist, Balliol Road, Bootle. Aged 50 years. Mr. Warhurst had been a Member of the Pharmaceutical Society since 1870.

On the 25th of December, Mr. William Shipley, Chemist and Druggist, Strong Street, Lower Broughton, Manchester. Aged 48 years.

BOOKS RECEIVED.

Sur la Recherche des Matières Grasses étrangères dans le Beurre; By A. Lalieu. From the Author.

Year-Book of Pharmacy and Transactions of the British Pharmaceutical Conference for 1888. From the Conference.

Sell's Dictionary of the World's Press and Advertiser's Reference Book for 1889. By Henry Sell. London, H. Sell. From the Publisher.

ANSWERS TO CORRESPONDENTS.

T. Jones.—*Pelasites fragrans.*

Justitia.—We are not aware that any right exists as to the exclusive use of the words in question.

T. G. S.—The answer to the question will depend upon whether a person has really had the experience required by the regulations.

Assistant.—The "vin de pepsin" of the Codex consists of 50 parts of "medicinal pepsine" dissolved in 1000 parts of a white wine.

Inquirer.—Each candidate for the Minor examination must produce a certified declaration that for three years he has been registered and employed as an apprentice or student, or has otherwise for three years been practically engaged in the translation and dispensing of prescriptions.

Communications, Letters, etc., have been received from Messrs. Stephenson, Wells, Milne, Jones, Butt, Cripps, Alcock, American.

LIBRARY

The Pharmaceutical Journal.

SATURDAY, JANUARY 12, 1889.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

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DEATH BY POISON.

THE interest that always attaches to the annual returns of the Registrar-General, in so far as they furnish a periodical indication of the extent to which poison has been a cause of death, must naturally be considerable from the pharmacist's point of view, inasmuch as the greater or less number of deaths from poison is apt to be regarded as some measure of the degree to which the provisions of the Pharmacy Act are in that respect effective in promoting the safety of the public. Strictly speaking, however, it is only in a very restricted sense that the data furnished by the Registrar-General as to deaths by poison can be applied for such a purpose, since there are many opportunities for the accidental or intentional misuse of poison, which are beyond the possibility of preventive control by any amount of caution on the part of the legitimate vendors of poisons, and are quite independent of the careful exercise of his duties as prescribed by law. But at the same time the evidence afforded by the annual return of deaths by poison is especially valuable in demonstrating that under existing conditions the deaths by poison of all kinds constitute but a small proportion of the total number of violent deaths. Moreover, if cases of suicidal poisoning be excluded from consideration, it becomes apparent that the accidental deaths resulting from the misuse of poison form a still smaller proportion to the total number of deaths from accident and negligence of all kinds. It is satisfactory to have been able, for a considerable number of years, to point to the continued testimony of the Registrar-General's returns to this effect, and to establish by such evidence the fact that the danger to be apprehended from poison is but small as compared with other causes of death by accident or negligence, while even in cases of suicide or murder poison is one of the least frequent causes of death. It may therefore be reasonably inferred that the obligations attaching to the keeping, dispensing and selling of such articles as have been declared poisons within the meaning of the Pharmacy Act have been efficiently performed by the persons authorized under that Act to keep open shop for that purpose, and that so far as the safety of the public is concerned, there is not any reason to add to the legislative provisions now in force for that object.

Passing on to the actual statistics of deaths by poison during the year 1887 it appears that the total number was 608, and of those 246 were cases of suicide, 2 of homicide, and 360 the result of accident or negligence. This latter number is somewhat larger than it was in the previous year, and the deaths by poison due to those causes also bore a higher proportion to the total number of deaths from accident or negligence of all kinds, the percentage being 2·32 as against 2·21 in 1886. Among the cases of suicide 11 per cent. were due to poison. The returns published this year continue to show that the occurrence of cases of poisoning, both accidental and suicidal, with certain articles that have not yet been constituted poisons in the eye of the law is still frequent. Carbolic acid, for instance, is especially prominent in this respect, having been the cause of death in 7·5 per cent. of the cases of accidental poisoning, and in upwards of 10 per cent. of the cases of suicide by poison. But notwithstanding these facts, and notwithstanding the repeated strong recommendations of coroners and others, the requisite approval by the Privy Council has not yet been given to the resolution passed now more than six years ago by the Council of the Pharmaceutical Society that carbolic acid should be included in the schedule of poisons. Consequently, carbolic acid can be sold without any necessary observance of precautions as to labelling, etc., and as a matter of fact it is supplied at oil shops and general stores, without any regard to its dangerous characters, to any persons, and even to young children, in all kinds of domestic vessels, such as cups, ginger-beer bottles, etc., and it has thus been continually the cause of a large number of fatal accidents. Among the other articles to which the resolution of the Pharmaceutical Society applied may be mentioned sulphuric acid, nitric acid and hydrochloric acid, all of which figure among the causes of death by poisoning, both accidental and suicidal.

In other respects the statistics of poisoning for the year 1887 present the usual features. The medicinal articles which stand most prominently out as the cause of death are the narcotics, represented by opium and its various preparations, laudanum, paregoric, soothing syrup, and cordial, as well as morphine and its salts. No less than 52 deaths of males and 42 of females are ascribed to accident or negligence in the use of one or other of these articles. Among the cases of suicide by poison they are also stated to have been the cause of the death of 31 males and 21 females. Vermin killers appear to be still employed for suicidal poison-

ing and notwithstanding the greater precautions that have been adopted in their sale they are set down as having been the cause of death in fifteen cases during the year; but it is very interesting to notice that vermin killers do not appear among the stated causes of death in any of the cases of accidental poisoning. This speaks well for the utility of the regulations that have recently been made compulsory on the vendors of these articles, in regard to labelling with the word poison, and in some cases the entry of the purchaser's name in a register of poison sales, and the result contrasts strikingly with the record of 27 cases of accidental poisoning and 25 cases of suicidal poisoning by carbolic acid during the year. Among the various other poisons to which death is ascribed by reason of accident or negligence many appear only in isolated instances, but oxalic is stated to have been the cause of accidental poisoning in 10 cases, and it is also stated to have been the cause of death in 27 cases of suicide. Another very striking record has reference to the deaths ascribed to accident or negligence and stated to be due to lead. These amount to no less than 101, or more than 28 per cent. of the cases of accidental poisoning.

THE USE OF METHYLATED SPIRIT.

In many places an impression appears to prevail that the general order issued by the Board of Inland Revenue last July, in reference to the use of methylated spirit by retailers of that article, will be applicable in the case of chemists and druggists who have a licence to retail methylated spirit and also use methylated spirit in the making of such preparations as belladonna liniment. As we are informed, there is an apprehension that in such a case it will be necessary to conform to the terms of the general order referred to applying to the Board of Inland Revenue for authority to use methylated spirit for the purpose and also giving security as required by Section 120 of the Spirits Act. We venture to think that this is a misapprehension, and that the general order referred to does not apply to cases such as are mentioned above. It is, of course, highly desirable that every requisite means should be taken to prevent any improper use of methylated spirit of a kind that would constitute an offence under Section 130 of the Spirits Act, but it does not appear that for such purpose it would be requisite for a retailer of methylated spirit to enter into a bond that he will not misuse the methylated spirit. Any such improper proceeding on his part would be liable to detection by the local excise officers, or by the inspectors under the Food and Drugs Act, so as to render him subject to the heavy penalties provided for in Section 130 of the Spirits Act. We cannot imagine that any person who would incur that liability by a breach of the law to be so easily detected would be any the more restrained from breaking the law by giving security than he would be without doing so, and it may be expected that chemists and druggists would at any rate be free from suspicion in that respect.

There is, however, a further reason for thinking that the provisions in section 120 of the Spirits Act as to authority being obtained to use methylated spirit, and for security being given as to its use, do not apply to the making of a preparation such as belladonna or aconite liniment. That operation cannot we think be deemed an "art or manufacture" within the meaning of the Act, because it does not involve any alteration or purification of the methylated spirit, which is simply put into the liniment and there remains as such. On the contrary, the kinds of "art or manufacture" in regard to which it was desirable to guard against any misapplication of methylated spirit on which duty had not been paid were, it may be presumed, those in which the use of methylated spirit was attended with an alteration or purification, so as to render the spirit more or less capable of being used as a beverage, and constitute, in case of its being so applied, a fraud on the revenue. There are many such manufacturing operations in which the spirit is recovered by distillation, and as they are carried on in private works the giving of security becomes a necessary safeguard against misuse. Cases of that nature are quite distinct from that of the keepers of open shops for retailing pharmaceutical preparations, and we cannot perceive on what ground the latter should be subjected to the provisions applying to manufacturers who use methylated spirit.

There is another important point to be considered in regard to aconite and belladonna liniments. These being essentially articles that are incapable of being used "wholly or partially as a beverage or internally as medicine" they are in fact altogether outside the scope of the Spirits Act, and it would seem that the making of them with methylated spirit, in cases where that is permissible for sufficient reasons, is also a matter with which the provisions of the Spirits Act have nothing whatever to do. That Act is specifically intended to protect the revenue from fraud, and the making of the preparations in question cannot possibly have the effect of defrauding the revenue.

We would remind our readers that the Chemists' Twenty-third Annual Ball is to be held on Wednesday next, the 16th inst., at the Portman Rooms, Baker Street, and point out that in order to facilitate the making of arrangements necessary for the comfort of those who take part in it early application for tickets should be made to the Honorary Secretary, Mr. W. H. Francis, 5, Coleman Street, E.C.

* * *

On Thursday next, the 17th inst., the eighteenth annual ball of the Midland Counties Chemists' Association will be held at the Assembly Rooms, Edgbaston, instead of at the Town Hall, as on previous occasions. Dancing is to commence at 8.30, and during the previous hour there will be a concert. We understand that there are numerous applications for tickets, and that the change of locality has given general satisfaction.

* * *

The next meeting of the Chemists' Assistants' Association to be held on Thursday evening, January 17, will be devoted to the reading of short papers by members.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, January 9, 1889.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Messrs. Allen, Atkins, Butt, Cross, Greenish, Hampson, Hills, Martin, Newsholme, Nichol, Richardson, Robbins, Savage, Schacht, Southall, Symes and Watt.

The minutes of the previous meeting were read and confirmed.

The Late Dr. Greenhow.

The President read a letter which he had received from Miss Greenhow, thanking the Council for the expression of sympathy recently conveyed to the family of the late Dr. Greenhow on the occasion of his decease.

Confirmation of Appointment of Examiners.

The President read a letter which had been received from the Privy Council, enclosing an order passed on the 18th ult. approving of the persons recently appointed as Examiners for England and Wales and Scotland respectively.

Mr. Symes asked if any further communication had been received on the subject of including carbolic acid in the Poison Schedule.

The President said no further communication had been received.

Visitor to the Society's Examinations on behalf of the Privy Council.

The President read a letter which had been received from the Privy Council office, informing the Council that Thomas Stevenson, Esq., M.D., had been invested with the responsibility of visiting the examinations of the Society in the room of the late Dr. Greenhow, and asking that notice should be given him accordingly of the dates of the examinations. The President said that this appointment had already been made public, and it would be remembered that Dr. Stevenson was one of the official analysts of the Home Office, lecturer on toxicological chemistry and forensic medicine at Guy's Hospital, and was also a Fellow of the College of Physicians and doctor of medicine. He was very well known as a scientific chemist. Although qualified as a medical man, Dr. Stevenson's career had always been in the direction of teaching and examination, and not in the practice of medicine. He thought the Society might be congratulated on the fact that a man so eminent in the medical profession and science, and who was so much in sympathy with both teaching and examining, had been appointed to this important office.

Dates of Examinations.

The President moved that in addition to the dates fixed last month the Board of Examiners for England and Wales should meet in December next. It had been thought that it might be more convenient to postpone this examination until January, but on consultation with the Examiners it was found better to adhere to the usual arrangements.

The motion was agreed to unanimously.

Diplomas.

The undermentioned, being duly registered as Pharmaceutical Chemists, were respectively granted a diploma stamped with the seal of the Society:—

Barlow, Alfred Henry.
Barnaby, William Arthur.
Burton, Joseph M. C.
Butcher, Wm. Frederic.
Chaston, Alfred Edward.
Ecroyd, Walter.
Fowler, William Henry.
Hampson, William.
Jackson, Urban Arthur.
Ough, Lewis.
Parry, John.
Robson, Tom Wardhaugh.
Vawser, Arthur.
Wood, William.
Young, Edward.

Elections.

MEMBERS.

Pharmaceutical Chemists.

The following having passed the Major examination, and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Barnaby, William Arthur .....Lincoln.
Burton, Joseph Montague Chas. Llandudno.
Chaston, Alfred Edward.....Alresford.
Hampson, William .....Manchester.
Mead, Frederick James .....Newcastle-on-Tyne.
Parry, John .....Twickenham.
Tull, Frederick Charles .....Windsor.
Watt, James, junr. .....Haddington.
White, William Louis.....Cambridge.
Wood, William.....Lemington-on-Tyne.
Young, Edward .....Liverpool.

Chemists and Druggists.

The following, who were registered as being in business on their own account before August 1, 1868, having tendered their subscriptions for the current year, were elected "Members" of the Society:—

Johnston, John .....Aberdeen.
Kinsey, Samuel Hinkley .....Scarborough.

ASSOCIATES IN BUSINESS.

The following having passed the Minor examination, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Cammack, Jno. Francis Jeffrey. London.
Cardell, Richard Taylor.....Bodmin.
Crarer, Edward .....Blairgowrie.
Edgar, Frederick George .....Petworth.
Gardiner, David ..... Haddington.
Hender, Walter Coad .....Plymouth.
Passmore, Arthur Bradshaw ...London.
Plumbe, Charles Marshall.. .. Mansfield.

ASSOCIATES.

The following having passed the Minor examination, and tendered their subscriptions for the current year, were elected "Associates" of the Society:—

Allen, Willie.....Basingstoke.
Asbury, Thomas .....Buxton.
Ayris, Harry Charles .....Nottingham.
Barker, Joseph.....Doncaster.
Bell, John Henry .....Windsor.
Clarke, William Ernest .....Aberystwith.
Franklin, John Henry .....Manchester.
Gantlett, Henry .....Wolverhampton.
Gardner, John .....Bolton-le-Sands.
Gregory, William John .....Weymouth.
Hall, Thomas Henry .....Hebden Bridge.
Heap, Isaac Henry .....Hanley.
Hearne, Robert Moore .....Worksop.
Hobbs, Alfred Ernest .....Tunbridge Wells.
Hudson, John Beckinton ..... Newcastle-on-Tyne.
Jenson, Alexander Benjamin...Birmingham.
Lee, Leonard .....Huddersfield.
Marsden, Frederic Steele .....Snaith.
Mills, George .....Southsea.
Neville, Thomas Crofts .....Leamington.

Parkyn, Horace .....Bath.
Stenhouse, Robert .....Dalkeith.
Sturges, Francis William .....Belgrave.
Tharratt, George Row.....Louth.
Tiffany, Joseph.....Mirfield.
Tomkins, William Kingston ...Oxford.
Tomlinson, Charles Parker ...Peterborough.
Vaughan, Edward Edwards ...Rhyl.
Ward, Oswald Thomas .....Diss.
White, Thomas Arthur .....Basingstoke.
Woodruff, Thomas .....Stalybridge.

APPRENTICES OR STUDENTS.

The following having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Abbott, John ....Lazonby.
Aplin, John Dare .....Colyton.
Austin, Stanley Rowe .....Devonport.
Baker, Vincenzo Dupuytren ...London.
Barclay, John .. ..Birmingham.
Batty, Thomas Edward .....York.
Belbin, Harry Ashley.....Sheffield.
Belcher, Charles Herbert .....Stafford.
Bell, Robert Armstrong.....Wigton.
Bennett, John Henry.....London.
Blakemore, John Bowen .....Oakengates.
Blanchford, Reginald Arthur .Sutton.
Boyton, Arthur James Henry Forest Gate.
Broom, George A. C. .....Llanelly.
Brown, Christian Charles .. ...Tintern.
Carter, Joseph T.....Middlesborough.
Cussons, John William .....Ossett.
Davies, John.....Torquay.
Eaton, John Alexander .....Clonmel.
Edwards, Robert Griffith .....Bala.
Egginton, John Tertius.....Sedgley.
Evans, William James .....New Quay.
Faulkner, William .....Newark.
Galloway, Philip Henry.....London.
Goldsworthy, William .....London.
Harper, William ....Turriff.
Hatton, Foster James..... ...Weymouth.
Heaton, John .....Rastrick.
Hoare, Austin .....Ilfracombe.
Hudson, Sutherland .....Dumbarton.
Hurd, William .....Nottingham.
Jacques, Sidney Paul.....London.
Jewell, Harry .....Salisbury.
Jones, Hugh.....Milnsbridge.
Kemp, Cecil Tabor .....Bournemouth.
Kirk, Alphonsus Joseph E. ...Ramsey, I. M.
Knight, John William .....Leicester.
Ling, Frederic George .....Southampton.
Lunn, Arthur .....Cambridge.
McFadzean, John .....Ayr.
Making, Edwin James .....Sudbury.
Marshall, Frederick Cornforth.Beverley.
Marshall, Robert James.....Boston.
Nurthen, Frederick William...London.
Parker, John Robert .....York.
Pearce, John Hammond .....Withington.
Perks, Alfred .....Birmingham.
Platt, William George .....Matlock Bath.
Plomley, Francis John .....Maidstone.
Pughe, Robert .....Machynlleth.
Ridlington, Walter Newton ...Kennington.
Roberts, Edward Orchard.....Truro.
Roberts, Walter ....Stroud.
Saunders, William John .....Strood.
Sayers, Arthur Hubert .....Chichester.
Scott, Walter Carey .....Northampton.
Shaw, Robert .....Sheffield.
Shove, Bertha ....London.
Spicer, Malcolm .....East Molesey.
Stephens, Frank Robert.....Clevedon.
Taylor, Charles John .....Sandgate.
Thomas, Frederick Charles ...London.
Tice, Henry William .....Weymouth.
Timmins, Albert .....Kidderminster.
Twigg, Paul O'Brien .....Bath.
Vincent, Robert .....Nottingham.
Walwin, Walter .....Warminster.
Wells, William.....Islington.
White, Challen.....Launceston.
White, Thomas Randal .....Durham.
Willmott, Alfred Wade .....Darlington.
Wolstenholme, William.....Sheffield.
Worth, Wallace .....Bristol.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

RESTORATIONS TO THE REGISTER.

The names of three persons who have severally made the required declarations and paid a fine of one guinea were restored to the Register of Chemists and Druggists.

REPORTS OF COMMITTEES.

FINANCE.

The report of this Committee recommended the payment of sundry accounts, including £92 10*s.* balance of £300 previously voted for the use of the Research Laboratory during the year.

The PRESIDENT in moving the adoption of the report said there was nothing calling for special remark. He might mention that though the price of the Calendar had been doubled the sale had increased. With regard to the Benevolent Fund, there was a charge of £12 for the printing of voting papers, which it had been considered right to debit to the Fund, though all the other work in connection with it was done by the Society free of charge. The donation account remained the same as last month.

Mr. BUTT moved an amendment to omit the payment of £92 10*s.* to the Research Laboratory. He was sorry to have to oppose this grant, not from any want of sympathy with the Research Laboratory, for he took great interest in it, and hoped good work would be done, but he considered this motion was premature. The Research Laboratory was not in working order until May 1, and before that date no work could have been done in connection with it, or salaries become payable. A Committee was appointed a year ago which met on January 31 for the first time, and one of its duties was to fit up the laboratory. Whether the Committee did the work itself or committed it to some one else he did not know, but if it did, and any payment was claimed in respect thereof, it ought to come forward as a separate matter, it could not come out of the money voted for carrying on research. He might be told that research had been carried on in the room downstairs, but if such were the case, and it had been done satisfactorily, there was no necessity to spend £300 on fitting up a laboratory for the purpose. It did not seem to him right that salaries or other payments connected with the Research Laboratory should commence until it was in actual working order.

Mr. HAMPSON formally seconded the amendment in order that it might be discussed.

The PRESIDENT said this money was asked for by the Research Laboratory Committee which would present its report next month, and then would be the proper time to criticize the way in which the money had been spent. The Committee might have asked for the whole £300 immediately it was voted, but it had only asked for money as it was required.

Mr. BUTT said he should probably be told next month that he was too late, if he made an objection then. When £150 was voted in July last he made a similar remark, and he was then told that was not the proper time. He thought now was the proper time, and whatever were the duties entrusted to the Committee he could not see that it had the power to incur liabilities for research before research was commenced in the Research Laboratory. It did not matter whether the amount voted was £300 or £900, as had been proposed, but which had been found to be beyond the Council's powers. The time when the payments commenced should be when the work commenced, and the second year's payment could not be voted until next May.

Mr. SCHACHT did not agree in Mr. Butt's view, as he understood the Committee had to manage the whole affairs of the Research Laboratory, from the time it was appointed. It would be quite open to anyone to criticize the action of the Committee when its report was presented, but he did not see how one portion of its duties could be separated from the rest—the administration of the £300 a year from the arrangements of the Laboratory. There was certainly no condition imposed when the grant was made that no one was to be paid for his services until a certain moment of time, when the Laboratory was supposed to be completed and actual work was being done there.

The PRESIDENT said he was not asking the Council to vote the money to any particular individual, but to the Research Committee, which was responsible for its expenditure. When the report was presented would be the right time to bring forward the motion, which seemed to him to be out of order at present. £300 had already been voted, and the sum asked for now was the balance of it. It seemed to him undesirable to enter now upon a discussion for which he was not prepared, and on a portion of the subject, without dealing with the whole. It would be open to Mr. Butt when the Committee reported to censure it, to suggest that it had been extravagant, or even to ask that it should refund the money if that had not been properly spent.

Mr. BUTT said he did not think the Committee ought to be paid one-third of the £300 before the year began.

The PRESIDENT remarked that, officially, Mr. Butt could know nothing about this matter, because the Committee had not reported.

Mr. BUTT said he did know officially, because he was asked to attend the Committee, and the information was given him.

The PRESIDENT repeated that, as a matter of courtesy, certain details might have been privately communicated, but, officially, nothing was known until the report was presented.

Mr. WATT thought the view taken by the President was correct, and that the amendment was not in order at present— that it was premature.

Mr. SYMES presumed that if Mr. Butt were assured he would have an opportunity of bringing forward the matter hereafter he would not desire to press the amendment.

Mr. BUTT then withdrew the amendment, and the motion was agreed to.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£5 to the widow (age 63) of an associate and member for twenty-two years. (London).

£10 to the widow (age 32) of a registered chemist and druggist, who died in October last. Applicant is in a situation, and has two young children. (Warwickshire).

£5 to the widow (age 67) of a registered chemist and druggist. Applicant has had two previous grants, the last in October, 1887, and is in bad health. (Devon).

£5 to the widow (age 62) of a registered chemist and druggist, who has been keeping a school, but is unable to maintain herself thereby. Has had two previous grants. (Sussex).

£15 to a former member and subscriber (age 67), who was an unsuccessful candidate at the last election of annuitants. (Manchester).

£12 to the widow (age 58) of a registered chemist and druggist. An unsuccessful candidate at the last election of annuitants. (Liverpool).

£12 to the widow (age 60) of a registered chemist and druggist. Another unsuccessful candidate at the last election of annuitants (London).

One application had been declined for the present.

The Secretary had reported that only two responses had been received to Mr. T. C. W. Martin's appeal through the pharmaceutical press for voluntary canvassers in London for the Benevolent Fund. The committee, having fully considered the subject, had arrived at the conclusion that the suggested scheme was impracticable, and recommended that it be not adopted.

The VICE-PRESIDENT, in moving the adoption of the report, said there were three cases which came before the Committee on which he should like to say a word. One was the case of an application which had been deferred for the present, for which postponement there were several reasons. It was from a widow who still retained possession of her late husband's business. Another reason was that she had entered upon the hire of a house at £80 a year with the view to letting, and it appeared that she was in debt £195. The Committee felt that this lady, with every desire to assist herself and family—for she had seven children depending upon her—was really taking higher ground than it was within the province of the Committee to deal with, and, therefore, though sympathizing with her, it was felt that the grant of a few pounds at present would be of very little service; but a time might not improbably come when, on another application, some substantial help might be given. Another case was that of another widow to whom £5 had been granted, and it appeared from her application that she was an applicant for a pension from the Peckham and Kent Road Pension Society, and seemed to have great hopes of succeeding and getting a pension of about 5s. a week. He mentioned that case in order that any member who had any influence, direct or indirect, with that society might exercise it in favour of this applicant. The only other case he wished to refer to was that of one of the three unsuccessful candidates for annuities, a gentleman who was older than either of the other competitors, and who had been for many years a contributor to the fund and a member of the Society. He always felt that a man of advanced age was really more needy than a woman, and the Committee, therefore, had given him rather more than the other unsuccessful candidates.

Mr. RICHARDSON said he was sorry to hear the report with regard to a special canvass in London for the fund, and he hoped that some further efforts would be made. It was a bad augury for the country to find that no organized attempt was to be made in London, when they were asked every year to organize in the provinces.

Mr. HAMPSON asked if some members of the Committee would give the reasons for the conclusion they had come to; perhaps some better scheme might be devised.

Mr. ATKINS said Mr. Martin had inserted in the trade journals a letter calling attention to this subject, and asking for a response in the shape of canvassers. Mr. Hampson naturally wished to know the reason which influenced the Committee in coming to its decision, and he might say that was the principal reason; the Committee deeply regretted to find

that the Secretary had received only two responses from the whole of London from gentlemen willing to take part in canvassing, and it was felt after that that no further move could be made in this direction. It was not that the matter was totally abandoned, because some further light might be thrown upon it, but in the direction in which this gentleman had so very wisely moved the response was so totally inadequate that it was felt nothing more could be done at present. He felt very strongly that if some mode could be devised by which Londoners could be approached, there would be, as there ought, a more adequate response. He was not in a position to say what was the amount of contributions from London as compared with the country, but he had a distinct impression that it was not in proportion to the means of London. There were men who gave largely and generously; but there were a great number who, perhaps from want of being properly approached, did not give, and if some means could be found for tapping that source of wealth it would be a great advantage.

Mr. ALLEN said he had not intended to speak on this subject, but after what had been said he felt bound to say that he thought the Committee was labouring entirely under a delusion. The Vice-President would remember that at the meeting of scrutineers this subject was informally introduced, and it was then generally admitted by the scrutineers present, who were among the younger and more active members of the Society, that such a scheme if properly carried out would be very useful; there were something like twenty gentlemen then present, any one of whom he believed would have undertaken a district, and he knew as a fact that some six or more were quite willing to do so. This was no new idea, and he believed if the Committee really thought that it was a proper and wise thing to undertake, seventy men would be forthcoming to carry it out. There had been no application on the part of the Council, though Mr. T. C. W. Martin had certainly written a letter to the papers, but that was quite a different thing.

Mr. HAMPSON thought it very undesirable that this matter should be passed over without further discussion. He thought the Committee should reconsider the subject and try to carry it to a practical issue, and he would therefore move an amendment that that portion of the report be referred back for reconsideration. He was quite sure that if an earnest attempt were made a number of individuals would be found to undertake the duties required, and if they only got a dozen for the first year it would be a step in the right direction, which would grow until it attained an organisation worth maintaining.

Mr. RICHARDSON seconded the amendment.

Mr. SCHACHT said this was not the first time the Council had found itself in some little difficulty owing to the enormous magnitude of London. No doubt this was felt in all directions, and the Legislature had now recognized for certain purposes certain divisions of the metropolis, and it might be worth considering whether it would not be well to appoint a local secretary in each of those divisions. Perhaps it would be well not to press an amendment at the present time, but the subject should certainly not be lost sight of. Not only in connection with the Benevolent Fund, but with other pharmaceutical matters it was sometimes felt that the representation of London was rather deficient.

Mr. RICHARDSON entirely agreed with Mr. Schacht. He thought the time had now arrived when the Council should move in the matter, and not leave it to outside effort, and appoint a local secretary in each parliamentary division of the metropolis.

Mr. MARTIN did not wish to throw cold water on the attempt to get more money, but he hoped as a country member that the idea would not go abroad that London did not do its duty towards the Benevolent Fund. In the last Calendar he found there were seven pages of subscriptions from London, whereas there were only thirty-nine for the whole of England and Scotland, and in those seven pages there were such sums as £100, £50, £25 and £10 quite common all down the list, but one would have to search a long time before one came across ten guineas in the country list. Of course he should be glad to see the Fund augmented from London, but the country members got a large proportion of the benefit of the Fund, and it was only right they should contribute in a larger proportion than they did.

Mr. ROBBINS thought the division of London by the County Council Act was a very reasonable way of getting out of the difficulty. Some of their friends in the country had very little idea of the size of some of these divisions, which would dwarf even some of the large towns in the country. If gentlemen could be got to undertake the duties of local secretary in such a large district the members ought to be very much obliged to them.

Mr. MARTIN thought a local Secretary for Liverpool would have quite as much to do.

Mr. BUTT was very glad to hear this suggestion, which was not a new one. Some few months ago he brought the same matter before the Library and Museum Committee, which went thoroughly into it. His suggestion was that a local Secretary should be appointed for each Parliamentary division, and considerable time was spent in discussing the proposal, but at that time the majority of the Committee was opposed to it. He did not know whether a different result would be arrived at now, but perhaps it might, and it would certainly be advantageous.

The PRESIDENT suggested that Mr. Hampson should withdraw the amendment. The paragraph in question referred only to Mr. Martin's suggestion, and if the Council were unanimous that the question of dividing London into districts both for the Benevolent Fund and other purposes should be referred to the Library and Museum Committee, that course might meet the difficulty.

Mr. HAMPSON said he should be quite willing to withdraw; all he desired was that the Committee should again take the matter into consideration, irrespective of any proposals now made. He thought it would be better to utilize any means which offered for assisting the fund. If twenty individuals could be found, who by their zeal and energy obtained £50 each for the fund, it would be a substantial addition. He was quite sure the discussion that day would bring a further indication of willingness on the part of members of the Society to undertake the work. If only one person conld be got to work in any district it would be a substantial aid, and if it were understood that the Committee would take up the matter again, he should be glad to withdraw the amendment.

The PRESIDENT said Mr. Hampson's object might be met by altering the recommendation of the Committee to the effect that the scheme be not adopted "at the present time." He was quite sure that the Benevolent Fund Committee would not lose sight of the subject.

The VICE-PRESIDENT said it was a source of great regret to him to find such a very small amount of response had been sent in to the Secretary in answer to Mr. Martin's letter. Whether an appeal by the Council rather than by an individual would have had more influence he did not know, but he did not see why it should. The request was that the reply should be sent to the Secretary. Whether if the appeal had been made in the name of the President it would have had more effect he could not say; perhaps it might; but he was much disappointed at the result. At the recent election, when the subject was mentioned and practically accepted, several volunteered to take districts.

but when they were practically asked to do so only two replies had been received, which was very disheartening. Perhaps the appointment of local secretaries in each London district might be re-considered by the Library Committee, for though it was quite true that there was a long talk about it some time ago, and many difficulties seemed to crop up, some of these might now have been removed. He should be very glad to do anything, even to come from the country, to assist in making a canvass in London, if a good scheme could be devised.

Mr. SYMES said there was a great deal of difference between advertising, which was the only way that could be adopted at present of asking persons to come forward, and appealing to them by letter, to which they in common courtesy would have to reply. If some one who knew London well enough could have given a number of names of gentlemen who it was thought would help in this matter, and they had been written to, he had no doubt a much larger number of replies would have been received; but what was everybody's business was nobody's business in particular, and probably to a certain extent that was the reason that a larger response had not been received. He should support the suggestion with regard to local secretaries, though he knew there were difficulties in the way.

Mr. HILLS thought perhaps the Committee was a little too ambitious to make a complete scheme for the whole of London at once. He thought if only two were willing to undertake the duty their offer should be accepted, and they should have the merit of initiating the movement, and seeing what could be done in their special districts. By the end of the year, if their results were good, there would be plenty of men come forward to take up the work.

Mr. SOUTHALL thought it would be as well to send the subject back to the committee for further discussion, but feared the suggestion to start these two good men was not exactly a wise thing.

Mr. ATKINS thought there were serious objections to sending the subject back to the Committee, and he would rather wait until there was a scheme brought forward with regard to local secretaries. He had himself an idea that it might by-and-by be possible to create in London what existed in other towns—some greater amount of local interest in Parliamentary or County Council districts. There were several practical difficulties in the way, and he trusted the matter would be allowed to wait until a report had been brought up. To ask these two gentlemen to go forward when there had been no further response would be scarcely wise.

Mr. HAMPSON said if that were the position taken up by the members of the Committee he should press his amendment. He understood from the President that if the amendment were withdrawn the Committee would reconsider the question, but it now appeared that Mr. Atkins did not desire to do so, at any rate until some scheme with regard to the appointment of local secretaries in the Parliamentary divisions was carried out. He did not take that view. He thought the Council should take some practical step, even if it were a small one, but he was quite willing to withdraw the amendment on the distinct understanding that such should be done.

Mr. SAVAGE thought much good would be done if the particular places from which the subscriptions came were stated. There were about 84 subscribers in Edinburgh, and about 841 in London, and he saw that many places with a large population contributed very little. If these special places were selected, and a reference made showing how little they had done, it might produce a good effect.

Mr. SYMES remarked that last year there was a special appeal, which produced a great many large donations in London that did not recur annually, so that he thought the last published list was hardly a safe criterion. At the same time, he did not mean to say that London did not do its duty as well as the country.

Mr. MARTIN said the special appeal was made throughout the country, and the same remark would apply to other places as well as London.

The PRESIDENT said the amendment before the Council was to send back this last paragraph for reconsideration. Even if that were done, he did not think the Committee need take any umbrage at it; but at the same time there was something to be said in favour of the official recognition of a person or persons to represent the Society in going into a chemist's shop to ask for anything, and he did object to a sort of haphazard offer of canvassing by Tom, Dick, or Harry, however good they might be. If the Committee thought it important that the canvassing of London should be made there were other ways of doing it, and it might be a question of whether the business way was not after all the best. He should not be disposed to refer this back in set terms, but rather to leave it open for further consideration on general grounds. It might be said that it was right for every member of the Society to influence his neighbour to give to the Fund, and that was no doubt so, but the influence of the neighbour would only be useful in so far as No. 2 received No. 1 as a friend. If that were not so No. 1 would not only produce irritation against himself, but against the Society as a whole, and more harm than good might be done. It was not good to be always begging for charitable purposes; he thought a vigorous effort from time to time, not too often, was the best way of proceeding. This proposition was a development or a repetition of one or two which had been made before, and it might be desirable to have a canvass annually, but if he had been able to be present at the Committee he should have been disposed to suggest taking an ordinary man of business and paying him to collect subscriptions in London. At any rate it would be desirable that the individuals having this duty should be invested with something like official dignity from the Society. In London men knew nothing of their next-door neighbours, a fact that was not sufficiently realized by those who lived in the country, or even in the suburbs. He should suggest to Mr. Hampson to kindly allow the report to pass as it was, and he would appeal to the Vice-President to bring the matter before the Committee again at the next meeting on general grounds, not necessarily to report immediately, and that he thought would meet the case, so far as the Benevolent Fund went. As regarded the other matter, it might be the subject of a special recommendation.

Mr. HAMPSON then expressed his willingness to withdraw the amendment, and the motion was carried unanimously.

LIBRARY, MUSEUM, LABORATORY AND HOUSE.

Library.

The report of the Librarian had been received, including the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
November	Day . .	749	39	20	29
	Evening .	262	26	7	12

Circulation of books.	Town.	Country.	Total.	Carriage paid.
November . .	199	155	354	£1 17 1

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

For the Library in London—

Allgemeiner österreichischer Apotheker-Verein, Zeitschrift, 1888. From the VEREIN.

American Druggist, 1888. From the EDITORS.
American Journal of Pharmacy, 1888.
From the PHILADELPHIA COLLEGE OF PHARMACY.
Analyst, 1888. From the EDITOR.
Archiv for Pharmaci og technisk Chemi, Jul.-Dec., 1887; Jan.-Jul., 1888. From the PUBLISHERS.
Asclepiad, 1888. From Dr. B. W. RICHARDSON.
Australasian Journal of Pharmacy, 1888.
From the PHARMACEUTICAL SOCIETY OF AUSTRALASIA.
British and Colonial Druggist, 1888.
From the PROPRIETORS.
Canadian Pharmaceutical Journal, 1888.
From the ONTARIO COLLEGE OF PHARMACY.
Chemical News, 1888. From the EDITOR.
Chemical Society of London, Journal, 1888.
— Abstract of the Proceedings, 1888.
From the SOCIETY.
Chemist and Druggist, 1888.
Chemists' and Druggists' Diary, 1889.
From the PROPRIETORS.
Journal de pharmacie, 1888.
From the SOCIÉTÉ DE PHARMACIE D'ANVERS.
Kaiserliche Akademie der Wissenschaften in Wien, Anzeiger, mathematisch-naturwissenschaftliche Classe, 1888. From the AKADEMIE.
Linnean Society of London, Journal, Botany, 1888.
From the SOCIETY.
Ny pharmaceutisk Tidende, nos. 13-26, 1887; nos. 1-16, 1888. From the PUBLISHERS.
Pharmaceutical Record, 1888.
From the EDITOR.
Pharmacie Centrale de France, L'Union pharmaceutique et le Bulletin commercial, 1888.
From the PHARMACIE CENTRALE.
Philosophical Society of Glasgow, Proceedings, vol. 19, 1888. From the SOCIETY.
Photographic Society of Great Britain, Journal and Transactions, 1888. From the SOCIETY.
Royal Botanic Society, Quarterly record, 1888.
From the SOCIETY.
Royal Gardens, Kew, Bulletin of Miscellaneous information, 1888. From the DIRECTOR.
Royal Medical and Chirurgical Society of London, Proceedings, new ser., nos. 17-19.
— Medico-Chirurgical Transactions, vol. 71.
From the SOCIETY.
Royal Society of London, Proceedings, 1888.
From the SOCIETY.
Sei-I-Kwai, Medical Journal, 1888.
From the SOCIETY FOR THE ADVANCEMENT OF MEDICAL SCIENCE IN JAPAN.
Société botanique de France, Bulletin, 1888.
From the SOCIÉTÉ.
Société française de botanique, Revue de botanique, 1888. From the SOCIÉTÉ.
Society of Chemical Industry, Journal, 1888.
From the SOCIETY.
Timehri, new series, vol. 1, part 2, 1887; vol. 2, part 1, 1888. From the EDITOR.
Western Druggist, Oct.-Nov., 1888.
From the PROPRIETORS.
Yorkshire College, Calendars for 1886-87, 1887-88, and 1888-89.
— Annual Report, 1887-88. From the COLLEGE.
Methods of Analysis of Commercial Fertilizers, Cattle Foods, etc.
From the U. S. COMMISSIONER OF AGRICULTURE.
Treitenfeld, Beiträge zur Toxikologie des Ortho- und Para- Toluidin, 1888.
From Professor DRAGENDORFF.
Gorham (J.), A System for the Construction of Crystal Models, 1888. From the AUTHOR.
Wiorogórski, Synonimy farmaceutyczne, chemiczne i techniczne, 1888. From the AUTHOR.
Madras, Report of Government Central Museum for 1887–88. From the MUSEUM.

For the Library in Edinburgh—

Australasian Journal of Pharmacy, 1888.
From the PHARMACEUTICAL SOCIETY OF AUSTRALASIA.
British and Colonial Druggist, 1888.
From the PROPRIETORS.
Pharmaceutical Record, Mar., Apr., Aug., Nov., 1888. From Messrs. T. and H. SMITH and CO.
Society of Chemical Industry, Journal, 1888.
From Mr. J. R. YOUNG.

The Committee recommended that the undermentioned books be purchased:—

For the Library in London—

Abney, Photography. *Another Copy.*
Davies, Preparation of Microscopic Objects.
Flückiger and Tschirch, Pharmacognosy, translated by Power.
Herefordshire Flora.
Boissier, Flora Orientalis, 1867–88. 6 vols. 140 francs.

For the Library in Edinburgh—

Alpe, Handy-book of Medicine Stamp Duty.

The Committee ordered the Library and Museum to be closed entirely from 2 p.m. on December 22, to 9 a.m. on December 27, and in the evening from December 27 to January 1 inclusive; also that the Society's house in Edinburgh be closed on Christmas Day and on New Year's Day, and in the evening from December 26 to December 31, both dates inclusive.

Museum.

The Curator's report had been received, and included the following particulars:—

	Attendance.	Total.	Highest.	Lowest.	Average.
November	Morning	534	45	8	20
	Evening	114	14	1	4

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

A fine specimen of crystallized calomel.
From Mr. E. J. MILLARD.
Specimen of fixed oil obtained from Lycopodium.
From Mr. A. C. ABRAHAM.
Quinine anisate, quinine anethol, quinine cinnamate, quinine ethylsulphate, methyl-quinine hydriodate, hydroquinine sulphate, quinidine benzoate, ethyl-quinidine hydriodate, cinchonidine camphorate, hydrocinchonidine, apocinchonidine, cinchotine sulphate, cinchotenine, cinchotenidine, cinchonamine, cinchoninate of copper, quinic acid, cinchonic acid, piperonylic acid, antifebrin, cusparine, paracotoin.
From the exhibit of the Fabbrica Lombarda di Prodossi Chimici at the late Italian Exhibition.
From Mr. B. KUHN.

To the Herbarium—

Specimens of *Maianthemum bifolium*, *Actæa spicata*, *Medicago denticulata*, *Gentiana Pneumonanthe*, *Orobanche elatior*.
From Mr. S. R. POWELL.
Specimens of *Erythræa littoralis*.
From Mr. PROSPER H. MARSDEN.
Specimen of *Carex montana*.
From Mr. E. H. FARR.

Duplicate specimens of dyeing and tanning materials had been forwarded to the Yorkshire College, Leeds, and a letter from the Yorkshire College at Leeds returning thanks for the donation had been received.

A series of duplicate specimens of American drugs had been sent to the Society's Museum at Edinburgh.

An application from Mr. S. J. Elliott, of Southport,

for the loan of specimens from the Museum to illustrate a lecture on "Stimulants and Narcotics," had been granted.

On the motion of the PRESIDENT the report and recommendations of the Committee were unanimously agreed to.

LOCAL SECRETARIES FOR LONDON.

It was moved by Mr. SCHACHT, seconded by Mr. HAMPSON, and resolved—

"That the Library, Museum, Laboratory and House Committee be requested to consider the desirability of the appointment of a Local Secretary in each Parliamentary division of London."

GRANTS TO PROVINCIAL SCHOOLS OF PHARMACY.

Mr. SYMES then brought forward the following motion of which he had given notice:—

"That the Library, Museum, Laboratory, and House Committee be requested to consider and report on the desirability of, and means at the Society's disposal for, granting annual sums in the way of endowments to provincial schools of pharmacy."

He said he had endeavoured so to word the motion as not to hurt the susceptibilities of any member of the Council. It might be thought that perhaps the present was not the most opportune time for considering a matter of this kind, but the difficulty really was to say which was the most opportune moment for doing so. There was no special request before the Council from any provincial association for help, and the Curriculum Bill, which was interwoven with this matter in some measure, had been withdrawn for the present. He took it, however, that an effort would be made to introduce the Bill again, and if it had been under consideration in the House a discussion of such a motion might be held to be unwise, because something might be said which would in some measure prejudice its passage through the House. Seeing, however, it was withdrawn for the present, he thought this was really the best time for bringing forward the question. If, for instance, a local association were applying for a grant, it might be thought that to meet the requirement would be sufficient, and the broader question of endowing schools at all should be left to some future time. If the Pharmacy Bill were introduced next session, it would necessitate some consideration of provincial schools. He had given this matter some attention for a long time, and the result of his observation and information was as follows. Going first to the north, he found that in Edinburgh there was no special school under the auspices of the Society, and though the education provided there seemed to answer the purpose for the moment, under the curriculum scheme there would certainly have to be some revision. There were three institutions or organizations by which students might be taught, one of which especially he had heard very highly spoken of, but if the curriculum scheme went through he thought the arrangements would scarcely meet the requirements without some modification. In Glasgow the school was a private one, and would not be recognized, he should imagine, under the curriculum. At Aberdeen, it would be remembered, an application was made some time ago for a grant, and there was some arrangement for teaching students; but the school, then understood to be in a flourishing condition, scarcely existed now. Coming to Newcastle, the impression on his mind some years ago was that there was a very flourishing school; a grant of £50 was made, and there was an idea in many quarters that there was a model school for the provinces. He did not know whether he was right in saying that to-day that school did not exist; if he were wrong Mr. Martin would correct him, but if it did it had but a feeble existence. Then again at Birmingham some few years ago a great effort was made. Dr. Redwood went down and gave a lecture and opened the school, and for some time it was thought that the Birmingham school was flourishing, but that also was now extinct. Then going across to Sheffield, from there there was a special application some few years ago for a grant, and when one was made the Sheffield men had the temerity, or wisdom, he would call it, to ask for another, and owing to that he believed the Sheffield school of to-day was really the one school which was in a flourishing condition. If experience were worth anything, looking at the various schools he had named, it was evident that if Sheffield had been left to itself entirely the day might come when they would mourn the condition in which that school would also be. There must be something wrong somewhere if all the energy and money which was expended ended in schools being created, flourishing for a few years and disappearing. He did not say anything like an endowment was to be the panacea for all these evils; in fact he was very much prejudiced against endowments. But as the President had said on the last occasion that he did not take a beating kindly, he would like to state that after he had opposed the making of a grant to the Research Laboratory for three years and advocated its being made for one year he had heard the President argue so ably that it would be absurd to do that, and that there must be some assurance of a continued supply of means to enable anything to be done, that he was convinced, and to-day he wished to apply the same principle to provincial schools of pharmacy, and asked the Council to consider the prudence of doing for these provincial schools something of the same sort as was done for research—not to make an accidental grant, as it were, but to assure these schools they would have a certain amount of financial support from year to year, provided they could show they were doing work. If the Society looked at its own school, what would it do without the endowment, which made a very large hole in £1000 a year? There were three chairs endowed, which amounted to £450; there were certain other expenses connected with the teaching, and a sum of £300 for research, which it had been constantly said was a part of education; and if the rent of the premises occupied was worth anything it would be seen that the total came very near the sum he had named. But for the moment striking off the research, that brought the amount down to something like £600, and there were about sixty students in the school. That was equivalent to endowing each student with £10 a year. He did not grudge that amount; it might be money wisely spent, although men came there who had no idea of following the calling, and others passed out of it afterwards. But he did not want to be too narrow; education was good wherever it was given, and it did the Society some good to find men in scientific and other spheres of labour in life who were always willing to own that they had obtained their early training at Bloomsbury Square. Still, seeing that this school was so largely endowed, and that it was successful, it seemed to him there was reason to think that if provincial schools were treated in the same way, if they had some little means afforded to pay the rent of the premises occupied, it would give an opportunity of really testing the efficiency of the work, and of enabling them to provide the means of carrying out the scheme which it was intended to place before them. It must be remembered that though the curriculum scheme, if the Bill passed, would not affect the examinations for some three or four years it would affect education almost immediately, and, therefore, it was not premature to bring the matter forward now, as it would take some time to carry out the organization. With regard to provincial schools generally, he found that men of ability could be obtained who would undertake to teach in them.

But they presently found it irksome; they had to prepare for their teaching work, and they gradually came to the conclusion that the labourer was worthy of his hire; they got other remunerative employment, and so the school died out. Although, as he had said, money spent on education was well spent, he was afraid these small sums expended from time to time scarcely did the good which was expected. He had put in a word or two with regard to the financial position, because he was aware that at the present moment the Council was face to face with the building scheme, which would absorb a good deal of money, and that it could not spend money freely in other directions without getting towards the end of its tether. He hoped the Committee to whom this would be referred if the motion were carried would weigh the matter well, for it was certainly quite as important that provision should be made for education as to put up a very fine structure. Moreover, the importance of education had been recognized long before the building scheme was brought forward, and had a prior claim to consideration. In conclusion he might say that he should accept the decision of the Committee, whatever it might be, and should not wish to re-discuss the matter, taking it for granted that the Committee would go into the subject thoroughly if it were referred.

Mr. SAVAGE, *pro formâ*, seconded the motion, in order that it might be discussed.

Mr. SCHACHT said he was not prepared to discuss this motion fully, and possibly the Council was not in possession of the facts enabling it to do so at that moment, but he might contribute a fact or two which had come within his knowledge, and which had induced him to say that Mr. Symes had scarcely fulfilled the duty which a man ought to discharge who introduced a subject of this sort. It was not fair to throw on the proposed Committee the work involved in getting up the whole case. The proposer ought to have come prepared to show that there was a probability of the report being favourable to the scheme he suggested. He did not know if Mr. Symes had had much experience of efficient local schools; possibly there were not many at the table who had had quite as much as he could boast himself, for having been from the first a member of the Council of the University College, Bristol, he was necessarily familiar with the difficulties which attended the establishment of a real school in science. He ventured to think the reason for the numerous failures which had taken place in connection with provincial schools of pharmacy was that they had not been efficient, not because they lacked an endowment of £50 or £100 a year from the parent Society, but because the circumstances were such as to prevent the possibility of the existence of a really efficient school of pharmacy in the respective centres in which they were attempted. He knew what it was in his own centre, and a good deal of what it had been in others, and the universal experience was that after the enthusiasm of a few individuals had passed away the schools had languished, because there were no settled lines on which it would be conducted with efficiency. This had driven him to the conclusion that in future, if anything of the sort were attempted, these schools must be limited to places where good schools of science already existed, and they were very few, and he ventured to think that the only chance of these University colleges continuing to flourish rested in the possibility of obtaining Government aid. The President was probably aware, and others might be also, that very strong efforts had been made to induce the Legislature to see that fact, and it was fortunate at the present moment that there was a Government one of whose members, who had the control of the public purse, was a strong educationalist. Mr. Goschen was known as a friend to education all through, and as a very temperate politician and one of broad views on this matter. The efforts which were being made to induce him to allow his own views to have a practical result had been attended with very hopeful results, and there was every reason to believe that an item would be included in the contemplated expenditure for next year which would materially help these institutions to which he had alluded. He felt certain that without that help these institutions must fail. They started the college in Bristol with a great deal of enthusiasm, and had done a deal of very good work, but, in order to keep it going, although the fees amounted to £1200 a year, the expenses were so great that a sustentation fund of £2000 a year more was required, which it had never yet quite been possible to gather, although there had been handsome contributions from the locality. The managers were therefore struggling on with a gradually falling sustentation fund, and it was evident that such an institution could not be kept up by a comparatively small community. They were, however, struggling on in the hope of being able to bridge over the interval until they could obtain Government assistance. That he believed was the story of every one of these institutions. A few, such as Owens College, had been more fortunate in having large endowments, but even they cried out for more help to enable them to do the work which it was their duty to do. The great point was the inability to get efficient teaching anywhere but in such centres, and with all his old enthusiasm for this very scheme, which had sometimes boiled over in unwise propositions, he had come to the conclusion at last that this cause was a hopeless one; that the Society could not sustain provincial schools, and that it must give that idea up. He, in fact, had come to the conclusion that his former efforts in this direction had been a mistake, and he wished to say so at once, because he felt it would be merely wasting good material to attempt to revive it. He would rather, therefore, that the subject were not referred to a Committee for further investigation, for he did not think there were facts existing to justify the Council in asking a Committee to undertake the task.

Mr. MARTIN said he should have preferred to exercise the gift of silence on this subject; but as he was entirely in sympathy with the spirit of the motion, as he took it every member of the Council was, and as Mr. Symes had referred to him, and to the school with which he had had something to do, he could scarcely pass it lest his silence were misunderstood. When he first saw the motion on the paper he endeavoured to see what was the meaning of it; but the greatest exercise of his imagination had not enabled him to discover what the Committee had to do, or how it was to do it, and therefore he saw no objection in referring it. The most cursory examination of the source of income of the Society, and the necessary expenditure of the Society, would convince anyone at once that there were no means to subsidize the provincial schools by annual grants. They would all agree as to the desirability of getting schools, but before doing so it was necessary to have a source of income which would enable that to be done with some prospect of continuance, and without landing the Society in bankruptcy. If all on the register of chemists and druggists would submit to the imposition of an income tax, their Chancellor of the Exchequer might then be able to put a penny on more or less in every year, and the endowment of schools would then be a very simple matter. Mr. Symes in a very long speech had referred to what had been done in various places, and at Bloomsbury Square; but if he had made the calculation as to the amount spent in education there at headquarters, and of the relation which that bore to the income of the Society from all sources, he would have found the amount due to Liverpool was about £2 6*s.* 8*d.*, and that due to Newcastle was £1.

Now to Newcastle the Council had given a capital sum which had it been invested would have yielded 30*s.* per annum, so that there they had really the full amount of the endowment to which they were entitled. With regard to Newcastle, it was not the want of means or of a teaching staff, but it was the want of the faculty of recognizing what the English people had yet to learn, that education was worth a sacrifice and must be paid for, which had led to their failure. The School of Pharmacy in Newcastle was not defunct; the Association could give a very good account of the grant of £50, for it could show four times the value of that in books, specimens, etc.; but with one of the ablest professors of chemistry in the country, with a laboratory, probably the finest in the country, there were six students working in it. There were thirteen or fourteen working in the science and art classes, where they paid half-crown fees, and lent themselves to earn an income for their teacher from the Government. The college at Newcastle had not lent itself to that. It advocated a reasonable fee which showed that a student was in earnest, and did not go there simply to amuse himself. He should strongly object to subsidizing education to the extent that students were practically irresponsible for any payment on their own account. In one of the largest centres science lectures were given at such a low rate that it was currently said it was the cheapest class of entertainment at which people could spend their evenings, and he objected to that kind of thing. He was strongly in favour of education, as was, no doubt, every member of the Council, but whatever the value of the motion from a strategic point of view might be he could not congratulate the author on any novelty in it. The principle was as old as the Society; provincial education was one of the foundation stones of it, as appeared from the earlier numbers of the Journal right up to the present. Whenever a concrete case was presented, the Council had not dealt with it on the strict merits in giving the local centre that modicum of money which would be its due in proportion to what it had done for the Society, but in a spirit of generosity. He might almost say, in the case of Newcastle, with lavish generosity; the local people did something, having raised £150, and the Society gave £50. Whenever it had been shown that any locality had made an effort, the Council representing the Society, which was only a small proportion of registered chemists and druggists, had dealt with the case in a spirit of generosity. He did not see, therefore, what the Committee could do, or that there was any occasion to refer the motion to a Committee, and hoped Mr. Symes would be satisfied to postpone this until the Council was face to face with the fact that it must provide for education, and when the men who wanted the education were compelled by the necessities of the case to pay for it.

Mr. NEWSHOLME said on first reading the motion he felt inclined to support it, but on further consideration he felt he could not, and that no good purpose could be served by carrying it. Up to the present time if any school in the country wanted money, and showed a good case, there had never been any difficulty in getting it, but no good purpose could be served until the Pharmacy Bill was passed. When that was done there would have to be some system of affiliation, and then would be the time to step out and help provincial societies. There was a feeling in the country that the Council was a body having any amount of money to give away, but they were rather getting over that idea in Sheffield. The school there was flourishing at present, but to provide against any difficulty in the future they were adopting a scheme to make it a great deal more self-supporting. A fund was being raised to be called the Sheffield School of Pharmacy Fund, and the idea was to raise subscriptions year after year. They knew they could not get lecturers to go on at the same rate as they were now paid, and their great hope was that in the immediate future the Pharmacy Bill would be passed, and then they could command better fees and make the school self-supporting.

Mr. SOUTHALL said Birmingham had been described as one of the unsuccessful places, and it did not seem to stand alone, but he did not think the want of success there had been from lack of any endowment. The chemists of Birmingham would be quite content to pay a certain amount of endowment to the teachers, but the difficulty had always been to get the scholars. In Birmingham there was Mason's College, which was well endowed, and if they could have guaranteed a certain number of students classes would have been started on purpose for them; but until the Society could compel young men to study for three years, as was proposed, it would be no use to make grants to schools to struggle on for a few years, or even to make permanent grants to local schools.

Mr. HAMPSON hoped Mr. Symes would withdraw the motion, which was extremely inopportune at the present time. There had been a most interesting discussion on the general question, and Mr. Schacht's and Mr. Martin's observations had been most valuable. The first thing to be considered was the financial position, and he maintained the Council had no right even to entertain the idea of making annual payments until the building operations had been finished, and they were able to turn round and see what was left in the coffers of the Society. Then, again, until the Bill had passed and the natural demand for education was established, it was no use attempting to deal with the question. What right had they to spend money all over the provinces for the sake of helping individuals to enter the trade and take away their living. It might be said that was a low view to take of it, but it was the true one. Every student should pay for his education. There was no right to expect provincial associations to give education free, as had been done to a great extent in the past.

Mr. ATKINS desired to express his thanks to Mr. Schacht for his remarks, and to assure him that he must not regard his life-work in support of education as having failed in the slightest degree, simply because there was a little delay with regard to legislation. Even if that were postponed indefinitely, the work Mr. Schacht had done could not possibly be lost. He hoped Mr. Symes would not press this motion, for though he sympathized with his object, there were various practical difficulties which he as a practical man must recognize. He agreed most strongly with Mr. Southall, although he spoke for a very small community, but one in which a class or school was founded, and this would have been maintained if only they could have obtained pupils, but these were not forthcoming. After the lapse of a year or two interest fell off, and the class, with an able teacher, had to close. All over the country it was found there was a want of continued interest on the part of students, and he did not see how that would be removed by endowments. He rather felt with Mr. Martin that payment on the part of the student was desirable as a guarantee of his interest in the education offered. He was rather surprised that as Mr. Symes had commenced with such a pessimistic list of results up to the present time, and he feared other names might have been added, that he should have advocated entering on a larger scheme. The time when this matter might be discussed would be when the ducation measure had passed through Parliament, since that would at once create a demand, but it appeared to him that nothing would create it but compulsion.

Mr. HILLS, as a resident in London, said he was in cordial sympathy with Mr. Symes's motion, for he thought the funds of the Society could not be better employed than in promoting education, whether in the

provinces or elsewhere; but previous speakers had shown very fully that on various grounds this was not an opportune time to pass such a resolution. Mr. Southall's remarks had been very much to the point, that the great failure after all was not due to the want of funds, for a year or two at all events, to give the thing a trial, but to the lack of enthusiasm on the part of those who had the care of the young men and of the young men themselves. He also agreed to a certain extent with Mr. Hampson that as a matter of finance it was not a good time to enter into a scheme of this kind. It would be well to get the building business settled first, and by that time he hoped the Curriculum Bill would have passed, and the Council would be able to see better how to proceed.

Mr. RICHARDSON said he had a good deal of sympathy with the motion, and thought every member of the Council came there as an exponent of education, but there was no doubt it was premature until an enforced curriculum was in operation. He had noticed how much moved Mr. Schacht had been in stating the conclusion he had come to; but he hoped, as a veteran advocate of education, he would still hold up his head, and that he would live to see the day when education would be considered as good for pharmacists as it was for other bodies. Mr. Symes had alluded to so much being spent on education in London, but that was only natural. You could not compare the House of Commons, the great Legislature of the country, with little town councils in Birmingham and elsewhere. In that building was *the* School of Pharmacy, and it was for every town to support the home of pharmacy in Bloomsbury Square. More would be done by local effort than by any grants from head quarters. He did not think there would ever be a provincial school of pharmacy which would be successful according to Mr. Symes's idea; there might be one or two scattered over the kingdom, but he should like to see not a school of pharmacy, but teaching centres in every large town where there were sufficient students. A very modest affair had been established in Leicester, but it was very successful. They had had one grant from the Society, and when they came in a year or two no doubt they would get another £20, and with that they could do an immense deal of good. They did not want annual grants, but diligent pupils, and there was always sufficient local effort to keep young men well abreast of all that was necessary for their instruction. If members of the Council could work more in their own centres, and speak less there, it would be much better for those who came afterwards. If Mr. Symes could have come and held up Liverpool as a magnificent example of local effort his remarks would have been listened to with very great pleasure; but he had not said a word about Liverpool. They all knew Mr. Symes's great abilities, and whatever he took up he pursued with zeal and energy. He even lectured at Liverpool, and occasionally when he did he believed he had audiences of about five, six or seven. That showed there was not that energy amongst the young men of Liverpool that might be expected. At present he did not see any necessity for making any grants, except when direct application was made; at the same time he hoped it would not be supposed that the Council was opposed to provincial education, for he did not think there was one there who was not anxious to promote it. He was perfectly satisfied with the efforts made in Leicester, where no doubt there was an excellent endowed school, the Wiggeston School, where a splendid laboratory had been established, of which the students had the use perfectly free; but for that they could not get the teaching they did. Science and art were not applicable to every trading community, and in those places it was no use attempting to establish schools; but in places like Birmingham, Newcastle and Nottingham, where there was an excellent science college, science and art were absolutely necessary for the local trade. He was sorry that Mr. Symes should have twice brought forward a motion which did not meet with the approval of the Council, but he hoped that next time he would be more successful.

Mr. ROBBINS said it was no use discussing this question at present, because the Council had not the power to carry the suggestion into effect. If it could get the powers of a Chancellor of the Exchequer, and obtain what money was wanted, it could act very differently. He thought the proper policy was to do one thing at a time, and do it well, and as the Council was already embarked on the building scheme it was useless to take up anything fresh until that was disposed of.

The PRESIDENT said he thought the London members rather left this question to be spoken to by gentlemen who represented the various centres of the country. They were sometimes told it was a great misfortune to be living in London, and that they knew nothing about education at all; nevertheless they did hear a great deal about demands for assistance for education, both for special and general purposes, of the kind referred to by Mr. Schacht, and he thought it might console that gentleman if he told him, from private information, that it was pretty certain every one of the colleges he had named would get something next year, the only matter for consideration being what the amount should be, and the apportionment of the lump sum over the various bodies. Might it not be said that the reason why these bodies had to go to the Chancellor of the Exchequer was much the same as it had been with the pharmacists? There had been a great number of pupils, but this was not nearly so large as it should be. The process of education amongst the general public was as slow as amongst their own body, although in many of these schools there were a large number of pupils. In Manchester, for example, so far as he could recollect, the fees paid especially for certain branches of education, were extremely low. Many of the colleges had endeavoured to encourage students to come by a very low scale of fees, but they had found that it did not pay, and that gratuitous education was a mistake. There was no doubt, as long as the State charged the Society with no special powers in regard to education it was impossible for it to do anything serious on a systematic scale with regard to students, and Mr. Symes practically admitted that himself. Anyone who had been in the examination room many years knew perfectly well what happened. The tendency of the pupil, wherever he was, at Birmingham, Newcastle, or Bristol, was not to do anything for himself towards acquiring real learning during his apprenticeship in the shop, nor even to attempt to make use of the facilities at his door, but to wait until he was out of his time, and then to come to London and in the space of a very few months be run through his examination. That was set before him by advertisement, by circular, and very often by his own master, and what wonder that this system went on, or that pupils declined to go in for continuous evening work for two or three years when they were told that in a few months, at the end of their time, they might come to London or Edinburgh and get all they wanted for the purpose of the examination, for they knew of no education except what was embraced in that term. Until the Legislature gave the Society powers to require evidence of *bonâ fide* education, as well as examination, the scheme would fail, and he believed the Council would do more mischief on the voluntary system by giving annual grants than at present. The best system of administering the fund was to leave the Council

absolutely unfettered to deal with each case on its merits. A scheme could never be framed which would be satisfactory uutil a Bill giving power to enforce the curriculum was passed. He knew how interested Mr. Symes was in the success of that Bill, and that he had always appealed to his friends in the provinces to support the Bill on the ground that it would enable the Society to do with effect something in the shape of helping to sustain or to found local schools; that was the direction in which to work. He was as interested as anyone could be in education, but it would be unwise and dangerous to give such support to local schools as would enable them to distribute what might be called cheap education. He believed all the members and associates were anxious to promote education in its widest sense. The idea had been to give assistance in illustrating courses of lectures, in fitting up laboratories, and providing books and apparatus; but the students must pay a proper fee, and he questioned very much whether a small subsidy, like that proposed to be given by the mover of the resolution, would be of much real use. The school he had in his mind would want a capital sum to start with, and possibly something from time to time, and if the time came when the subject could be dealt with with some hope of getting pupils as well as teachers it would have to be dealt with more in that spirit than in the shape of small annual grants. As Chairman of the Committee he should not object to going through the work involved, but as many gentlemen had already said, the fact was you might establish a splendid school, and yet pharmaceutical students would not attend. At Manchester a portion of the University had been devoted to pharmaceutical purposes, much to the inconvenience of the staff, who wanted the room for other purposes, but he was afraid it would have shortly to be closed for want of pupils.

Mr. Symes, in reply, said it was evidently felt that the motion was either premature or inopportune, and he should therefore withdraw it, but it would be only fair to make a few remarks on some of the criticisms which had been made. Several gentlemen had reiterated the statement that they were all in favour of education, but that was certainly not necessary to be stated over and over again. It had never entered his mind that any gentleman ever came there with the intention of doing anything except what was best according to his judgment. Taking the remarks in the reverse order, he felt the force of the fact that the curriculum would be the thing to create provincial schools, and he had worked very hard, perhaps as hard as anyone in his own sphere, to get it. He had written to all the members of Parliament he knew anything of, and in a few cases where he got what appeared to be a rebuff he had written a second and third time, in order to get them to support the Bill, and with the exception of the President, he had given as much time as any members of the Council to promote it. Mr. Robbins's remark was logical, that the Council could not afford it, and if so, there was an end of the matter. He gave Mr. Richardson credit, as he did the others, for coming there to do the best he could, but he might have done it in a less personal manner than he had that morning. It was unfair to come and state that he was in the habit of giving lectures in Liverpool to audiences of six, which was not the fact. He had not gone into the facts with regard to the Liverpool school, though it was fairly satisfactory, and the last gentleman who had been appointed examiner was educated there and came up from it, and passed the Major examination. There was in Liverpool also a university college, which was in a very satisfactory condition. He did not take such a pessimistic view as Mr. Atkins perhaps thought; he was simply regarding the facts, and in Edinburgh he believed there was very good teaching, only the existing organization would not meet the requirements of the curriculum. In thinking of the question of the expenditure, it was well to bear in mind the source of income, and he believed the largest source arose from the examinations.

The President said the great bulk of the income arose from subscriptions, though there was a balance in the Society's favour from the examinations.

Mr. Symes said he did not follow Mr. Martin's arithmetic exactly as to why each place could only claim a certain small amount, because he had no idea of calculating things out in that manner. If there were a good thing still going on in Newcastle, and it wanted £20 this year and £20 the next to ensure its going on and doing useful work, it should be granted. He was a little disappointed with Mr. Schacht's view of the limited number of centres at which schools could be established, and if it were so it would be exceedingly unfortunate. He thought Mr. Schacht had rather an exalted notion of what those schools should be, and very properly so, but if any good was to be done to pharmacy there must be a large number of centres. He looked to something like endowments to have a larger number of schools on a smaller scale, efficiently conducted, distributed all over the country, which would be centres not only of education, but of interest in the Society and its work. The more centres of interest in the Society the more likelihood there would be of bringing in a large number of persons who still remained outside of it,

The motion was then withdrawn.

The Pharmacy Act Amendment Bill.

The President reported that the Pharmacy Act Amendment Bill had been withdrawn in the last session of Parliament, and he proposed, with the permission of the Council, to refer it to the Law and Parliamentary Committee at its next meeting, to consider in what form it should be presented in the next session.

Correspondence.

A letter had been received from Mr. Saul acknowledging the honour conferred upon him in appointing him an examiner.

Also a letter from Mr. Parsons, of Boulogne-sur-mer, thanking the Council for the *Pharmaceutical Journal*.

Report of Examinations.

December, 1888.

England and Wales.

	Candidates.		
	Examined.	Passed.	Failed.
Major (12th)	3	2	1
,, (13th)	3	3	0
,, (19th)	4	3	1
,, (20th)	5	3	2
,, (21st)	5	4	1
	— 20	—15	— 5
Minor (12th)	27	10	17
,, (13th)	27	15	12
,, (14th)	30	17	13
,, (19th)	26	12	14
,, (20th)	27	17	10
,, (21st)	24	14	10
	—161	—85	— 76
Modified (19th)	2	0	2
	183	100	83

Preliminary Examination.

Ten certificates were received in lieu of the Society's examination.

General Purposes Committee.

The report of this Committee included the usual letter from the Solicitor stating the progress which had been made with various cases placed in his hands. Judgment had been obtained against one offender, and another had sent the amount of two penalties claimed and costs. In several cases there had been a difficulty in obtaining the requisite evidence.

The Committee had considered another case of alleged sale of poison by an unregistered person and recommended proceedings, a warning having previously been given.

This report was considered in Committee.

On resuming, the report and recommendations were unanimously adopted.

PRELIMINARY EXAMINATION.

January 8, 1888.

The following were the questions set for this examination :—

LATIN.

(*Time allowed—from* 11 *a.m. to* 12.30 *p.m.*)

I. (*For all Candidates.*) *Translate into Latin :—*

1. The general's father was praising the consul.
2. The State will be preserved by good laws.
3. Eleven soldiers of the tenth legion had lost their swords.
4. I know not what to say or do.
5. Having finished their work, they returned to the city.

II. Translate into English either A. (Cæsar) or B. Virgil.

(*Candidates must not attempt both authors.*)

A. Cæsar.

1. Quum ab his saepius *quaereret*, neque ullam omnino vocem *exprimere* posset, idem Divitiacus Aeduus respondit: Hoc esse miseriorem et graviorem fortunam Sequanorum quam reliquorum, quod soli ne in occulto quidem queri, neque auxilium implorare *auderent*; absentisque Ariovisti crudelitatem, velut si coram adesset, horrerent: propterea quod reliquis tamen fugae facultas daretur, Sequanis vero, qui intra fines suos Ariovistum recepissent, quorum oppida omnia in potestate ejus essent, omnes cruciatus essent preferendi.

2. Hic locus ab hoste circiter passus sexcentos, uti dictum est, aberat. Eo circiter hominum numero sedecim milia expedita, cum omni equitatu, Ariovistus misit; quae copiae nostros perterrerent, et munitione prohiberent. Nihilo secius Caesar, ut ante constituerat, duos acies hostem propulsare, tertiam opus perficere, jussit. Munitis castris, duas ibi legiones reliquit, et partem auxiliorum; quatuor reliquas in castra majora reduxit.

Grammatical Questions.—For those only who take Cæsar.

1. Decline in full, singular and plural, *hic locus*, *omni equitatu* (Par. 2).
2. Write in full the perfect indicative and present subjunctive of the verbs in italics (Par 1).
3. Account for the mood of *esse*, *auderent*, *adesset* (Par. 1). Explain the construction of *munitis castris* (Par. 2).
4. Mention the prepositions which govern both the accusative and the ablative, and state when they govern the one case and when the other.

B. Virgil.

1. Corripuere viam interea, qua semita monstrat;
   Jamque ascendebant collem, qui plurimus urbi
   Imminet, adversasque aspectat desuper arces.
   Miratur molem Æneas, magalia quondam,
   Miratur portas, strepitumque, et strata viarum.
   Instant ardentes Tyrii; pars ducere muros,
   Molirique arcem, et manibus subvolvere saxa;
   Pars optare locum tecto, et concludere sulco;
   Jura magistratusque legunt, sanctumque senatum.
2. Dixit, et in mensam laticum libavit honorem;
   Primaque, libato, summo tenus *attigit* ore.
   Tum Bitiæ dedit increpitans; ille impiger *hausit*
   Spumantem pateram, et pleno se *proluit* auro;
   Post alii proceres. Cithara crinitus Iopas
   Personat aurata, docuit quæ maximus Atlas.

Grammatical Questions.—For those only who take Virgil.

1. Decline in full, singular and plural, *adversas arces*, *ardentes Tyrii* (Par. 1).
2. Write in full the perfect indicative and present subjunctive of the verbs in italics (Par. 2).
3. Parse fully—*Primaque*, *libato*, *summo tenus attigit ore* (Par. 2).
4. Mention the prepositions which govern both the accusative and the ablative, and state when they govern the one case and when the other.

ARITHMETIC.

(*Time allowed—from* 12.30 *p.m. to* 2 *p.m.*)

[The working of these questions, as well as the answers, must be written out in full.]

1. Find the cost of 175 cwt. 14 lb. 12 oz. at £1 13*s.* 4*d.* per cwt.
2. Simplify $\dfrac{2\frac{1}{3}+\frac{4}{5} \text{ of } 3\frac{1}{3} \text{ of } \frac{3}{4}-2\frac{1}{2}}{\frac{9\frac{1}{6}}{5}}$
3. Divide the product of 1·23 and ·0059 by ·005.
4. Find the value of 3·75 of 8*s.* 4*d.* + ·59 of £2 15*s.* + ·027 of 18*s.* 6*d.*, and express the result as a fraction of £7 4*s.* 11*d.*

*5. Give, as nearly as you can, the equivalents of the following in English measures :—*mètre*, *kilomètre*, *kilogramme*, *hectare*. Divide 167 *stères* 4 *décistères* by 62.

*6. A contractor engaged to finish 4·68 kilom. of railway in 150 days; but, after employing 98 men for 65 days, he found that only 1960 metres were completed. How many additional men must be engaged in order that the work may be finished within the given time?

7. If 7 per cent. is lost by selling goods for £145 6*s.* 3*d.*, what would be gained per cent. by selling them for £168 15*s.*?

ENGLISH.

(*Time allowed—from* 3 *p.m. to* 4.30 *p.m.*)

[Read carefully the following passage before answering questions 1, 2, and 3, which refer to it.]

" But scant three miles the band had rode,
When o'er a height they passed
And, sudden, close before them showed
His towers, Tantallon vast:
Broad, massive, high, and stretching far,
And held impregnable in war.
On a projecting rock they rose,
And round three sides the ocean flows;
The fourth did battled walls enclose,
And double mound and fosse."

1. Parse fully the words *scant*, *sudden*, *vast*, *stretching*, *held*, *fourth*.
2. Write out, in a tabulated form, all the verbs, with their subjects and, where possible, direct objects.
3. Give a list of all the prepositions with the words they govern.
4. In the following passage supply the necessary capital letters, and put in the stops and inverted commas where requisite:—Well said robert after a moment his lip drawn and quivering you told him the story i suppose seven deaths is it by now well what sort of

* At least one of these two questions must be attempted by every candidate.

impression did these unfortunate accidents and he smiled produce he talked of sending money said meyrick doubtfully he said he would have henslowe up and inquire he seemed put about and annoyed oh elsmere you think too hardly of the squire that you do."

*5. Give an outline of some favourite book, *or* an account of some modern invention with which you are familiar.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday, the 2nd instant.

Present—The President, Mr. James E. Brunker, M.A., in the chair; the Vice-President (Mr. Draper), Mr. Hodgson (Treasurer), Messrs. Pring, Charles Evans, Doran, Merrin, Whitla, Wells, Grindley, McCormack, Hayes, and Professor Tichborne.

Carbolic Acid and the Poison Schedule.

A letter was received from Dr. J. W. Moore, Registrar of the College of Physicians of Ireland, stating that the President and Fellows of that College had made representations to the Privy Council in Ireland in accordance with the memorial of the Council of the Society, asking that carbolic acid should be scheduled as a poison and required to be kept in vessels of distinctive shape and appearance.

The President observed that the Privy Council were exceedingly slow in adopting the proposal respecting carbolic acid, which had been made to them, not only by that Council but also by the Council of the Pharmaceutical Society of Great Britain. It would seem as if trade interests were in some way interfered with by the restrictions which the Council desired to see carried out, and "skilled opinion," whatever that may mean, was opposed to the proposal. Hardly a day passed without some fatal accident occurring from the improper use of this dangerous article.

Mr. Wells observed that the word "keeping" seemed to imply more than was necessary. He understood that the restriction was wanted merely with respect to the bottles in which carbolic acid was retailed.

The President: Our recommendation is that in every possible way mistake as to carbolic acid should be prevented; but we need not go into details as to how that should be done until we see whether the Privy Council will accept our recommendation at all.

The Vice-President: There have been about five accidents per month.

The President: Five per week.

Mr. Hodgson: A great many accidents occur from keeping carbolic acid in porter bottles and soda-water bottles.

The Vice-President said there was a necessity for very stringent regulations as to how this article should be retailed. The wholesale dealers in the article should be entirely subject to the opinion of the retailers in the matter.

Mr. Wells: I do not object to any restrictions, but I should like something to be proposed that can be done. It would be hard to have vessels of a distinctive shape provided. I myself put a distinctive tally on the jars.

Mr. Hayes: It comes here in large barrels.

The President said the words used by the Council in their original memorial were that the article should be "kept and retailed in bottles of a distinctive shape and appearance."

Visitor's Report on the Examinations.

A letter was read from Sir William Kaye, Q.C., Clerk of the Privy Council, enclosing a copy of the Report of Dr. George F. Duffey, the Visitor to the Lord Lieutenant, on the examinations of the Society held during 1888. The report stated as follows:—

"There has been no change during the year in the examiners, nor in the mode of conducting the examinations generally. The limited accommodation afforded in the rooms in which the examinations are held proved, on some occasions, as I have previously reported, a serious inconvenience. I would therefore suggest that when in future the candidates at any examination exceed eight or ten in number temporary arrangements should be made to hold the examination in some more suitable building until the Society secures larger premises than those it at present occupies, or that the examinations might be so arranged that, when necessary, the candidates should be divided into two or more batches, and the hours and days occupied in the examinations should not be so restricted as at present. For the Preliminary examinations 52 candidates presented themselves. This was an increase in the number over each of the two preceding years, that for 1886 being 46, and for 1887 being 45. The percentage of rejections was a little below that of 1877, viz., 46 per cent., against 47·8 per cent., but was higher than that for 1886, in which it was 42·2 per cent. In accordance with suggestions I had the honour to make in former reports, the Council of the Society in March last adopted new regulations for the Preliminary examination, which subsequently received the approval of your Excellency and the Privy Council (Order in Council, 18th April, 1888). The chief alterations made by these regulations were the addition of a specified range of subjects in elementary physics to the examination; the substitution of a defined curriculum in rudimentary chemistry and botany for text books; the addition to the examination in English of a paper in grammar, including orthography and parsing; the allocation of a standard of marks for the subjects of the examination; and a declaration of the percentage to be obtained in English and arithmetic (50 per cent. of the entire marks), as well as on the entire course (40 per cent.), to enable a candidate to pass. These regulations came into force at the July examination, and must be regarded as a decided advance. It is satisfactory also to note that, subsequent to the adoption of this improvement, the General Medical Council recognized, *pro tanto*, the Preliminary examination of the Society as one of those examinations on the subjects of general education which qualified the person who passed it to be registered as a medical student. The importance that should be attached to the possession of a good general education by anyone who desires to become a member of an educated scientific body, such as pharmaceutical chemists should be, cannot be too often insisted upon. The system of apprenticeship that is compulsory renders such an education all the more essential, as during that period opportunities for obtaining it are either neglected or do not exist, and the want of a sound early education in after life is a disadvantage, not alone to the individual, but to the status of the profession he may obtain an entrance into. Without necessarily raising this examination to the standard of those fully recognized by the General Medical Council, or beyond that which I conceive is desired by the Council of the Society, and should be required by the public, there is still, I think, room for improvement in it—even as far as the present subjects of the examination go—and necessity for care being taken that candidates are not allowed to pass it with merely superficial knowledge of some of the subjects they are examined in. These remarks apply specially to Latin, and to the rudiments of botany, chemistry and physics. Some candidates who failed to obtain a single mark, or who only obtained one mark or two marks out of a maximum of ten in one or

* This must be attempted by every Candidate.

other of these subjects, and who did not even score a fair percentage in the total pass marks by superior answering in the other subjects were allowed the examination. Apart from the advantage derived from an elementary knowledge of Latin as an educational training, as long as the prescriptions of medical men, and the directions for their employment, are written in that language, it is necessary that persons who propose to become pharmaceutical chemists should have a fair knowledge of it, as well as of the other subjects of the examination. The ignorance of Latin that as a general rule is displayed in the extremely easy examination candidates are subject to at the Preliminary examination, and in the reading of prescriptions at the examination for the licence, is in some instances most glaring, and shows a great deficiency of education in this subject of the examination, which generally reflects itself in the other subjects also. Although the number of marks allowed for Latin and the rudiments of chemistry, etc., is properly, perhaps, lower than that allocated for English and for arithmetic, still, if candidates showing such deficiencies as I have pointed out are allowed to pass, the standard of the examination cannot be maintained, and the educational status of the pharmaceutical chemist would, I fear, consequently suffer. As the Preliminary examination at present is, with the exception of dictation and the examination in Latin, conducted entirely by means of printed papers, I would suggest that in future—and following the practice that I believe exists in the corresponding examination of the Pharmaceutical Society of Great Britain—the candidate should be examined in Latin by means of a printed paper. In this paper he might be given a passage from the specified authors to translate into English, and be required to parse and answer grammatical questions on it, as well as asked to translate some easy sentences in English into Latin. At the same time, the examiner should not be precluded from putting *vivâ voce* questions in any of the subjects for the purpose of ascertaining the competency of the candidate to pass. Analysing the results of the Preliminary examinations during the year 1888, in a similar manner to that adopted in my last report, it appears that of the 52 candidates who presented themselves for examination, 28, or 54 per cent., passed; while 24, or 46 per cent., were rejected. Five of the unsuccessful candidates had failed to pass at previous examinations also. The greatest number of failures, viz., 19 out of the 24 unsuccessful candidates, was in arithmetic. There were 16 failures in English, 14 in the rudiments of botany, chemistry, and physics (considered as one subject), and 10 in Latin. (A) Of those, 5 in number, who failed in one subject only, 2 failed in arithmetic, and 3 in English. (B) Of those, 7 in number, who failed in two subjects, 3 failed in arithmetic and in the chemistry group; 1 in arithmetic and English; 2 in arithmetic and Latin; and 1 in chemistry and Latin. (D) Of those, 8 in number, who failed in three subjects, 5 failed in arithmetic, English, and chemistry; 2 in arithmetic, English, and Latin; and 1 in chemistry, English, and Latin. The four remaining unsuccessful candidates failed in all the subjects of the examination. The highest percentage of marks attained by any candidate was 87 per cent., and the lowest percentage obtained by any candidate who passed was 44 per cent. At the examinations for the license 41 candidates presented themselves during the year. In 1887 there were 44 candidates, and in the year 1886, 33. The percentage of failures has, it is satisfactory to report, fallen considerably for the last two years, while the standard of the examination has been steadily maintained. In 1886 the rejections amounted to 66·6 per cent. In 1887 they were 43 per cent., and this year they fell to 39 per cent. The following is an analysis of the results of the examinations. Of the 41 candidates 25 passed (61 per cent.). (A) Of those, 6 in number, who failed in one subject only 4 failed in practical chemistry, and 2 in pharmacy. *Note.*—Two of the above four who failed in practical chemistry were subsequently allowed the examination by the Examiners by virtue of the discretionary power allowed them. These are the first instances in which the power, to which I have repeatedly called attention, has been exercised. (B) Of those, 2 in number, who failed in two subjects, both failed in botany and in practical chemistry. (C) Nine candidates, including one who absented himself from the rest of the examination, after failing badly in chemistry, failed in all the three groups of subjects. (D) One candidate obtained passing marks in all the subjects, but failed to attain the total number required to pass. There were, therefore, 15 failures in chemistry, 11 in botany and materia medica, and 11 in pharmacy. Five of the unsuccessful candidates had also failed at former examinations for the license, four once, and one twice previously. One of the successful candidates had failed at five previous examinations; another thrice, four twice, and three once previously. The highest percentage of marks attained by any candidate was 94 per cent. The lowest percentage of marks obtained by any candidate who passed was 57 per cent. Although the majority of the rejections this year, as may be seen from the foregoing analysis, is still, as in former years, due to failure in practical chemistry, the increased percentage of passes shows that the new regulation of the Society as regards the curriculum in practical chemistry (*vide* Order in Council of the Lords Justices and Privy Council of March 21, 1888) has already produced good results. This regulation—which was adopted in order to counteract the evils of the system of 'cramming' for the examination that I called attention to in previous reports—requires each candidate before admission to examination to produce evidence of having actually worked at the bench in the laboratory during his three months' course of practical chemistry for one hundred hours. The effect of this regulation will, I believe, be advantageous to the candidate after he becomes qualified, and its utility is already further apparent in the improved manner in which the necessary manipulations are performed during the practical examinations in chemistry itself. Another portion of the examination that it is essential, more than any other part, perhaps, that a pharmaceutical chemist should have a thorough knowledge of, is practical pharmacy. Notwithstanding that the Society requires a certificate of having served as an apprentice or an assistant for a term of four years in the employment of a pharmaceutical chemist, or other person duly qualified to give a certificate of such service, or two years in the case of candidates who have passed the Preliminary examination prior to January 1, 1884, it is clear that the means of obtaining a practical knowledge of compounding and dispensing in their various branches differ widely in different establishments. In the absence of a school of pharmacy under the direction of the Society, the problem of fixing any curriculum in this subject, and of obtaining satisfactory proof of adequate and *bonâ fide* instruction therein and of securing attendance thereon is a difficult one. While, therefore, under existing circumstances the regulations of the Society in this respect are perhaps as good as can be enforced, it would seem desirable that the extent and nature of the practical education the candidates have received should be thoroughly tested. With this object I would suggest that the examination in practical pharmacy should be expanded so as to ascertain their ability to make preparations of the British Pharmacopœia as well as other pharmaceutical preparations in more or less daily use. At present this portion of the examination is not conducted under the eye of the examiners, and owing probably

o want of space and limited time is confined generally to the spreading of plasters and the compounding of pills and of mixtures from original prescriptions, some of the ingredients in which were occasionally not available for the use of the candidate. The candidate, on the completion of his work, brings it up for the inspection of the examiner, who in the meantime has been engaged in the *vivâ voce* examination of another candidate. As a matter of importance to the public, I would also suggest that a test of the candidate's knowledge of the regulations to be observed in the sale of poisons under the Sale of Poisons Act, 33 & 34 Vict., should form part of the examination in pharmacy. The lack of suitable specimens for the examination in materia medica has been complained of by the examiners, and was brought before the Council of the Society in August last. Steps have, I believe, been taken to supply a complete set of specimens for this purpose, and it is to be hoped that it will be available for the next (January) examination. —I have, etc., GEORGE F. DUFFEY, M.D., Visitor."

The Vice-President said it was only courteous to Dr. Duffey to propose that his report should be on the table until the next meeting of the Council, when it could be discussed.

The President said it would be better to refer the report to the ordinary examination committee, who could make any observations they pleased upon it.

An order was made accordingly.

The Pharmacy Amendment (Ireland) Bill.

A letter was read from Messrs. Clay and Close, dated December 18, stating that the Pharmacy Amendment (Ireland) Bill was now dead for the session, as when it was mentioned on the previous night in the House of Commons, no member responded, and the Bill was consequently struck out. The writers expressed their regret that there should have been so unsatisfactory a termination of the matter, but they trusted that it would be possible next session to model a Bill which would prove satisfactory to all parties, and be allowed to pass into law. The letter was marked and read.

Resignations of Members of Council.

Letters were read from Sir George Owens and Dr. Montgomery to the President, stating that they had fully considered the expression of the regret of the members of the Council at their resignations, which had been conveyed to them by Mr. Brunker, but that they did not consider that it would be of any advantage to the Society for them to withdraw their resignations. A letter of a similar character from Dr. Collins was also read, in which he expressed his conviction that his membership of the Court of the Apothecaries' Hall was not compatible with membership of the Council of the Pharmaceutical Society, and his letter concluded as follows: "Permit me to explain more fully the reasons which induced a majority of the Hall Court, without any unfriendly feeling to the Pharmaceutical Society, to pass the rule objected to. The reasons were two: First, that the intention of the medical men who took part in framing and in getting the Irish Pharmacy Act passed was that the Pharmaceutical Society should be an independent body, altogether separate, as far as possible, from the medical corporations; second, to induce and encourage young men intending to join the medical profession to serve an apprenticeship or pupilage to a general medical practitioner rather than to a pharmaceutical chemist. I did not agree in opinion with the majority. Trusting that an amicable arrangement will be arrived at, and wishing the Pharmaceutical Society of Ireland continued and increased prosperity, I remain, dear Mr. Brunker, with kind regards to each member of the Council, very truly yours, T. COLLINS."

The President: Gentlemen, you are all aware of what occurred at the last meeting of the Council. The letters from Dr. Montgomery and Sir George Owens were received a few days after; and I thought it my duty, after consultation with the Vice-President, to write to them asking them, as well as to Dr. Collins, to reconsider their determination, as their loss would be a very serious one. All these three gentlemen were members of the Society from the time of its first constitution. Dr. Collins was one of the most useful of our members, and for fourteen years was most regular in his attendance at our meetings and committees, giving us the advantage of his mature experience. Dr. Montgomery was also a most useful member, was one of our examiners for a time after the Society was first started and in every way made himself serviceable to us. Sir George Owens, too, has always been a regular attendant at our Council meetings whenever anything of importance was going on. I personally regret extremely that these gentlemen should now retire. With a small Society like ours we cannot readily fill three such vacancies; we cannot expect from young members the experience and energy possessed by the gentlemen who are leaving us. I have done all in my power to induce them to withdraw their resignations, but you see my efforts have been in vain, and I see nothing for it but to accept their resignations. It is only due to them to express in the strongest possible terms our regret at being obliged to do so.

The Vice-President: We all endorse the words which have fallen from Mr. Brunker on this very painful subject. We all regret the retirement of these three gentlemen from our midst. That it is inevitable, we see; but that it is not the less to be deplored we feel.

The President moved the following resolution:—

"That in accepting the resignations of Sir George Owens, Dr. Collins, and Dr. Montgomery, this Council expresses its great regret that these gentlemen could not see their way to the reconsideration of their determination; and that our best thanks are hereby conveyed to them for their invaluable services to the Society since its formation."

The Vice-President: I second the motion.

Mr. Hodgson said he quite agreed in the spirit of the motion, and in its being moved and seconded by the President and Vice-President.

The President said the next business was to fill the vacancies. He had been in Cork and had seen Mr. Richard Sumner, a rising member of the Society there, who had agreed to serve on the Council. At the last annual election Mr. Morgan Darcy, of Tipperary, was a candidate for membership of the Council, but some irregularity had occurred in his nomination. He (the President) had asked him if he was willing to serve, and had received a reply in the affirmative. Mr. Baxter, of Coleraine, a former candidate, was also willing to serve.

Professor Tichborne: I know that Mr. Baxter is a very high class pharmaceutical chemist, and a very well educated man.

On the motion of Professor Tichborne, seconded by Mr. Merrin, the three gentlemen above named were unanimously elected members of the Council.

A donation was received from the British Pharmaceutical Conference of the 'Year-Book,' 1888.

Medical Bodies and the Society's Certificate

A report was read from the Committee to whom the letter of Mr. Hill complaining of the refusal of his certificate by the conjoint Committee of the College of Surgeons and the Apothecaries' Hall, had been referred was read. The Committee, which consisted of the President, the Vice-President, and Messrs. Charles Evans, Grindley, Allen, and Hayes, recommended that a letter should be addressed to the Chairman of the Committee of the conjoint examinations for diploma

of the College of Surgeons and the Apothecaries' Hall enclosing a copy of Mr. Hill's letter, and protesting in strong, but respectful, language against the exclusion of licentiates of the Pharmaceutical Society of Ireland from taking part in the education in practical pharmacy of candidates for the joint diploma under the rule relating to pharmacy in the published scheme. It was to be pointed out that the rule differed essentially in this respect from that adopted for the joint examination of the College of Surgeons and the College of Physicians. It was also recommended that a letter on the subject should be addressed to the General Medical Council.

The President intimated that both the letters recommended by the Committee had been sent.

The Registrar read a reply which had been received from the Registrar of the General Medical Council stating that the question was not one with which that Council had power to deal, such details being left to the individual qualifying bodies, but that he was authorized to point out as an argument in favour of the recognition of their certificate which the Council of the Irish Society desired that in the regulations of the conjoint examining boards in England the certificate of the Pharmaceutical Society of Great Britain was recognized.

The President said no reply had been yet received from the joint Committee of the College of Surgeons and the Apothecaries' Hall.

On the motion of Mr. Hodgson, seconded by Mr. Doran, the report was adopted.

The Vice-President made a report on behalf of the Committee who had been appointed to inspect the chemical laboratory of the City of Dublin technical schools. The Committee were represented by Mr. Allen and himself. They unfortunately were there on an evening on which the class did not meet. They were, however, taken over the place by the Assistant-Secretary. They found a room well equipped with all the materials for the teaching of analytical chemistry quite as good as existed in the College of Science in Professor Galloway's time. There were benches enough to teach fifty students. They noticed some deficiencies which Mr. Dixon said would be supplied. They asked could a compulsory attendance of 100 hours be guaranteed; and Mr. Dixon said he would confer on that point with his committee, the school course at present being only one of four months. They had not heard from Mr. Dixon since; but if his letter should be satisfactory he (Vice-President) would certainly be in favour of recognizing the City of Dublin Technical Schools. Both Mr. Allen and himself were of opinion that it would be very desirable to encourage those most deserving schools.

The President: Mr. Graves, the secretary, is an old acquaintance of mine, and I am quite certain he will do anything he can to improve the efficiency of the schools, and to meet our wishes.

Mr. James Nethery, of Dungannon, Mr. Michael Frances O'Donnell, of Phipsborough Road, Dublin, and Mr. James Noy Vance were elected members of the Society.

Some financial business having been disposed of the Council adjourned.

Parliamentary and Law Proceedings.

Sale of Beef Wine and the Inland Revenue.

At the Christmas Quarter Sessions for the borough of Bradford on Friday and Saturday last, in the Town Hall, Mr. Gainsford Bruce, Q.C., M.P., the Recorder, heard an appeal from a decision given by the borough magistrates on November 20 last. On that date Samuel Miller, chemist and druggist, of 32, White Abbey Road, Bradford, was summoned at the instance of the Inland Revenue authorities for selling wine by retail without a licence, the liquid sold being known as "Pearson's Liebig's Beef Wine." This was made up in pint bottles, and was sold by the defendant as a medicated preparation. The case was dismissed by the magistrates, who, however, expressed the opinion that it was advisable that the matter should be tried in a higher court. An appeal was accordingly entered.

The case for the appellants was that the liquid was a wine, for the sale of which a licence was required, and that the respondent, in selling it by retail, rendered himself liable to the penalty which the Excise authorities sought—namely, £20.

For the respondent's case, Mr. Waugh said his contention was, seeing that there was no definition in the Act of Parliament of the word wine, that wine must be taken in its ordinary and popular sense—that was, a liquid produced by fermentation from the grape for the purpose of consumption as a beverage. This was such as would be the popular definition of what wine was—and anything which had obtained a commercial importance, apart and distinct from wine, would not be wine in the popular sense, and in order to say whether an article was wine or not they must first decide what was the purpose for which it was sold. If it were purchased as medicine, and as medicine alone, and not for the purpose of consumption as a beverage, then that would not be wine within the meaning of the section. He would prove that this liquid could only be taken in certain doses; that it was not suitable for consumption as a stimulant—in fact, that as a stimulant it was useless, and that it was only as food that it was useful. In this instance port wine only formed one of the ingredients. If they had a mixture of port and other things, so as to change the constituents of that port, although port might be the chief ingredient, then his contention was that that mixture ceased to be a wine and became an article of commerce, and that the purpose for which it was used was most material in deciding whether this liquid was wine or not. If it could not be used for the purpose for which port wine was used, namely, as a stimulant or beverage, but only used by people as a food, then it was not a wine in that sense. It did not correspond with the accepted notion of wine: it could not be used, and was not used as wine. It could only be used as food, and as a result of this it could not come under the section under which the respondent was summoned. This production was sold as Pearson's Liebig's Beef Wine; it was neither designated nor sold as port wine or port. As an analogous case he would suppose that a person sold jellies, and said that the chief ingredients were best gelatine and choice sherry; could it for a single instant be suggested, under the section, that he was selling foreign wine, that he was selling sherry? With regard to the question as to whether this was *bonâ fide* wine, the article, it was admitted, could as wine be produced and sold at 8*d.* per bottle at the outside. Who in the world, then, was going to give three times as much for the sake of the makers evading the excise licence? In every bottle of the beef wine there was the expressed juice of 2½ pounds of beef. This cost money, and in addition, there was extract of malt and quinine. He was going to call the testimony of medical men, who would tell, from their own experience, that they had constantly ordered the beef wine in cases, when to have ordered port wine or invalid port would not have been of any use at all. They would say that as a stimulant this liquid was useless, but that as a food it was most valuable; that it would be an advantage if the quantity of stimulant in it were less; but that less stimulant could not be used so as to preserve the food properly.

Evidence on behalf of the respondent was then called.

Mr. John Scott, manager of the company's branch in London, spoke of the sale which the liquor in question had, of the manner in which it was put up, and of the extent of the business with regard to it.

Mr. W. G. Tacey, surgeon, of Manningham Lane, said that he had been acquainted with Pearson's Liebig's Beef Wine for about two years. It was known among the medical profession, and if ordered under the designation of beef wine there would not, he thought, be any difficulty in obtaining the liquid. He himself prescribed it as a tonic and restorative; it was certainly not prescribed as a beverage. The result of drinking it as a beverage would be a disturbance in the stomach and headache. This would be the result of drinking more than the prescribed quantity. Half a wineglassful two or three times a day was the usual dose. He did not think that port wine given under the conditions for which he gave the beef wine would have the same effect on the patient as the latter. He was satisfied, from a microscopic examination which he had made of some of the liquid, that meat was present. In the residue, after evaporation, he discerned the presence of crystals of creatin —a body sparingly found in muscular fibre. In his opinion the creatin found would represent a great proportion of meat. He considered that some alcohol would be necessary to preserve the purity of the liquid, but he could not say how much. He was induced to prescribe this liquor in preference to port wine owing to its nutritive conditions.

By the Recorder: There was a nutritive quality in port wine in addition to its quality as a stimulant.

Mr. John Bradley, surgeon, of Rand Street, Great Horton Road, stated that he had known the liquid for two years, and, so far as he knew, it was well known in the profession. He had ordered the article as a food or tonic. The effect of taking too much of it would be to disturb the stomach. There was not a sufficient quantity of the stimulant in it to make one drunk. As a beverage the liquid was not agreeable to take; to him the taste was disagreeable. In his opinion the preparation was a food and a medicine.

Mr. Thomas Wilmot, surgeon, of Lumb Lane, was of the same opinion as the last two witnesses. He considered that the liquid contained more nourishment than port wine.

Mr. Waugh then addressed the Recorder. He said that the article in question had been in the market for a number of years, and it had acquired a reputation as a food medicine and a tonic. The result was that it was known as a food medicine and tonic throughout the kingdom under the name of Pearson's Liebig's Beef Wine. He submitted that the facts of the case abundantly proved that if one were to ask for wine, no wine merchant would under any circumstances give Pearson's Liebig's Beef Wine. Well, if the merchant would not send a consignment of this article it was perfectly clear that it could not be wine in the ordinary sense of the word. On the other hand, if one were to ask for Pearson's Liebig's Beef Wine, one could not get anything else but that liquid. He submitted upon the facts that the justices were right in finding that this liquid was not a wine within the meaning of the Act—that it had not been compounded for the purpose of selling wine for the purpose of evading the duty had been abundantly proved. So far as the evidence was concerned, no one would take the compound except for medicinal purposes. Under the circumstances the respondent was permitted—unless the Recorder came to the conclusion that this was done simply for the purpose of evading the Excise regulations—to sell the liquid, and no harm could come to him in consequence of not having an Excise licence.

Mr. Beverley added a few remarks to Mr. Waugh's address, and submitted that it was quite unlikely that the introduction into the liquid of disagreeable ingredients would be calculated to increase the sale of the liquid as a beverage.

Mr. Longstaff, for the appellants, submitted that the justices were wrong in the decision which they gave in this case on November 20 last, and he contended that the substance was wine and not medicine, and that therefore the appellants were entitled to a decision in their favour. It was owing to the evasion—he did not say, of course, of this one—by many of these preparations of the exemptions which were granted by the Excise Commissioners that an attempt had had to be made to put a stop to the practice.

The Recorder then gave his decision. He said he was of opinion that this article described as Pearson's Liebig's Beef Wine was wine. He did not rest his decision upon the description; but he thought that this liquor, containing, as it certainly did, not less than 88 per cent. of port wine, was wine. He thought it had not lost its character as wine because it was mixed with other ingredients. It had been contended that this preparation was not to be treated as wine, because it was often prescribed as a medicine; but he did not think that the purpose for which it was used could affect the nature of the thing itself. There were many cases in which wine and brandy were prescribed as medicine; but they did not lose their character from being so used. Then it was said that this preparation was disagreeable and unpalatable; but this did not, it seemed to him, affect the question. Many bad wines were, he had no doubt, unpalatable; but he thought it would be to establish a very erroneous standard to hold that the question of the exciseable nature of an article depended upon its taste. He thought that the foreign matter in this liquid—12 per cent.—did not alter the character of the wine. If all the wine that was sold was free from the Excise duty because it was adulterated to the extent of 12 per cent., then he was afraid that the Inland Revenue would suffer very largely. It was said, too, that the respondent might avail himself of the exception contained in Statute 16 of George II., Chap. 8, Sec. 12, which provided that "Nothing in the Act contained shall extend to any physicians, apothecaries, surgeons, or chemists, as to any spirits or spirituous liquors which they may use in the preparation or making up of medicines for sick, lame, or distempered persons only." In his view this exception did not apply, because he thought that the port wine used in this case was not a spirit or spirituous liquor within the meaning of the section. More than this, he thought that the wine was not used by the respondent in the preparation or making up of medicine. He thought that the section did not apply to a case like this. Therefore, the result of his decision would be to reverse the decision of the magistrates, and to grant the order asked for before them.

The Recorder went on to say that he would mitigate the penalty, and very considerably, under the impression that the question was not to recover a penalty. He would probably, unless something was said to the contrary, inflict a nominal penalty.

Mr. Longstaff said he would leave the matter in the Recorder's hands.

The Recorder then said that he would inflict a penalty of 10*s*.

After some discussion with regard to the question of costs, it was decided to fix them at £25. The result of the whole matter, therefore, was, appeal allowed, penalty 10*s*., and costs £25.—*Bradford Observer*.

Charge of Incorrect Dispensing under the Food and Drugs Act.

At the Buxton Sessions, on Saturday, Colonel Shortt, Inspector of weights and measures, summoned Wm.

Henry Beck, chemist, Spring Gardens, Buxton, for having, on November 24, unlawfully sold to the prejudice of one, Robert Tomlinson, the purchaser, a certain drug, to wit, a bottle of medicine which should have contained 160 grains of iodide of potassium, but which only contained 142½ grains, contrary to Sec. 6 of the Food and Drugs Act, 1875. Mr. F. W. Beck, of the firm of Nive and Beck, Luton, defended.

Evidence having been given of the purchase of the medicine at defendant's establishment by Robert Tomlinson, assistant to Colonel Shortt,

Mr. Alfred Henry Allen, public analyst for the Northern Division of Derbyshire, stated that the sample had been examined by him and contained 14¼ grains of iodide of potassium in each fluid ounce, equal to 142½ grains in the whole ten ounces dispensed. The proportion of iodide ordered in the prescription was 160 grains in 10 ounces or 16 grains in each fluid ounce. The deficiency of 17½ grains in the bottle was not sufficiently great to be of material importance with regard to the efficacy of the medicine, but was quite beyond the limits of reasonable variation.

In examination by Mr. Beck the witness said in his analysis he worked by centimetres.

Mr. Beck: You say that the efficacy of the medicine was not materially affected.

Witness: If I were a medical man I might take a rather restricted view of it. Iodide of potassium is called a blood purifier. It is a heavy dose prescribed. I should have thought 20 per cent. a reasonable variation. No doubt bottles vary in size.

Mr. Beck quoted from a paper written by Mr. Thompson, an authority in the chemical profession in the dispensing of prescriptions, and Mr. Allen being appealed to admitted he should regard Mr. Thompson's statements with very great consideration.

Mr. Beck, for the defence, contended that there was no offence on the part of his client. The section under which he was prosecuted referred entirely to the purity of the article, and it was not so much as suggested that the iodide of potassium was not pure. The law would not convict a man of a criminal offence on speculative evidence of this description. The defendant had had twelve years' experience, and had several testimonials as to his skill in his profession.

Colonel Shortt, interrupting, said there was no suggestion of fraud.

Mr. Beck argued that there was, and the amount he was charged with not giving to the purchaser amounted in value to about one-third of a penny. Could it for a moment be supposed that a man would run the risk of damaging his business for such a small sum as that?

Several witnesses were called for the defence.

One of them, Mr. Michael Conroy, the representative of Evans, Sons and Co., of Liverpool, swore that iodide of potassium from the same stock as that supplied to Mr. Beck was practically absolutely pure. Bottles varied considerably in size owing to the thickness or otherwise of the glass.

The defendant then stated in detail his mode of dispensing the prescription. He weighed 160 grains most carefully. The bottle was a 10-ounce one, and if the contents were taken in ten doses the patient would get the exact quantity.

Mr. Edward Davies, for twelve years public analyst in the Isle of Man, was also called, and lastly Mr. Wright, chemist, Buxton, all in behalf of the defence.

The Chairman of magistrates (Mr. Hubbersty) said the Bench had decided to dismiss the case. They considered 160 grains had been put into the bottle in accordance with the prescription. At the same time they thought the custom of filling the bottles up with water from the tap instead of by accurate measure was, to say the least of it, lax.

Costs were not allowed.—*Sheffield and Rotherham Independent.*

Obituary.

Notice has been received of the death of the following:—

On the 24th of December, Mr. John Phillips, Pharmaceutical Chemist, Commercial Street, Newport, Mon. Mr. Phillips had been a Member of the Pharmaceutical Society since 1853, and for many years filled the office of Local Secretary.

On the 28th of December, Mr. Henry Hills Heslop, Chemist and Druggist, late of Kingswinford. Aged 34 years. Mr. Heslop was an Associate of the Pharmaceutical Society.

On the 28th of December, Mr. Robert Walker, Chemist and Druggist, Smallbrook Street, Birmingham. Aged 54 years.

On the 31st of December, Mr. John Smart, Chemist and Druggist, West Dulwich. Aged 50 years. Mr. Smart had been a Member of the Pharmaceutical Society since 1869.

On the 1st of January, Mr. John Ball Collins, Chemist and Druggist, Park Terrace, Teddington. Aged 48.

On the 7th of January, Mr. Benjamin Pulin, Chemist and Druggist, Grey Terrace, Sunderland. Aged 82.

Review.

YEAR-BOOK OF PHARMACY: comprising Abstracts of Papers relating to Pharmacy, Materia Medica, and Chemistry contributed to British and Foreign Journals from July 1, 1887, to June 30, 1888; with the TRANSACTIONS OF THE BRITISH PHARMACEUTICAL CONFERENCE at the Twenty-fifth Annual Meeting, held at Bath, September, 1888.*

The contents of this work are so fully described in the somewhat prolix title as to render a detailed enumeration of them here unnecessary. It may be stated at once that the new volume forms no unworthy successor to those that have preceded it. The 'Year-Book' of abstracts extends through 210 pages, being considerably fewer than has been usual; but the more condensed form in which the editor now presents the abstracts has allowed him to deal with a large number of subjects, and it is needless to say that even the briefest notices contain the pith of the original papers so far as it is likely to be of interest to pharmacists. One amusing slip, however, occurs on p. 68, where Mr. Siebold gives an epitome, with a reference to this journal, of Dr. Kauder's paper on cryptopine, which was read at the Manchester meeting of the Conference, and appeared *in extenso* in the transactions printed in the previous 'Year-Book.' The abstracts are preceded by the usual well-written introduction, and followed by a "Bibliography" for the twelve months. Then come the Transactions, containing all the papers and discussions that occupied the Conference at Bath, and lastly, the Unofficial Formulary in its latest form.

* London: J. and A. Churchill, 1888. Demy 8 vo., pp. 1–505.

BOOK RECEIVED.

ELEMENTS OF PHARMACY, MATERIA MEDICA AND THERAPEUTICS. By William Whitla, M.D., etc. Fifth Edition. London: Henry Renshaw, 1889. From the Author.

Mr. Ward and *Mr. Rimmington* are thanked for their communications.

Barometer.—The question can be determined with so little trouble by a practical experiment that we recommend you to adopt that course.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Wybrant, Morrison, Proctor, Wells, Doin, Ham, R. M. W.

LIBRARY ST BARTHOLOMEW'S

THE SULPHUROUS ACID AND SULPHITE OF SODIUM OF PHARMACY.

BY BARNARD S. PROCTOR, F.I.C.

The considerable instability of sulphurous acid and sulphite of sodium makes it desirable that pharmacists should have a more ready means of ascertaining the condition of their stock than the volumetric method of the B. P.

Without raising any objection to the official process as a scientific operation, I have no hesitation in saying that it is much more troublesome than it need be to attain the practical result required, and very far from being such a task as a dispenser would willingly undertake when he finds sulphurous acid prescribed, and feels uncertain whether his stock can be depended upon as of full official strength. As an equivalent of the official volumetric process a satisfactory titration may be performed as follows. Put into an ounce vial 11 grains of iodine and 15 grains of iodide of potassium, pour upon them a fluid drachm of the acid to be tested, rinse the measure with a drachm of water, adding this to the contents of the vial, and shake well. The iodine colour should disappear, if the acid be of full strength; this however is not often the case,* and the degree of deficiency may be roughly estimated by adding successive portions of the acid, say ten minims at a time, till the *brown* colour disappears. There is no necessity for using starch to prove whether or not the iodine has been entirely converted into hydriodic acid, as the colour of free iodine and its disappearance are very sharply marked if the sulphurous acid be added by single drops towards the end of the reaction.

One hundredth of a grain of free iodine, which is equivalent to one-eighteenth of a minim of B.P. sulphurous acid, gives a distinct brown-yellow colour to a drachm of solution, but though this colour entirely disappears when there is just sufficient sulphurous acid to convert the iodine into hydriodic acid, a few drops more of the sulphurous acid again developes colour, this time a lemon-yellow, removable by a small further addition of iodine or a free dilution with water. This lemon-yellow colour, produced by any considerable excess of sulphurous acid, need not cause any hesitation in the use of this method, as the difference between the lemon and the brown tint is sufficiently distinct, and the former is accompanied with the odour of free SO_2. In the B.P. test the sulphurous acid is diluted with a large bulk of water, which diminishes the loss by evaporation during the operation, prevents the formation of this lemon tint, and ensures the complete conversion of the sulphurous acid into sulphuric, which under some circumstances does not take place in concentrated solutions; but the water for dilution requires to be recently boiled and cooled, otherwise so large a bulk might contain in solution sufficient free oxygen to vitiate the result, and when the operation is performed in the manner just indicated the necessity for large dilution is done away with, the boiling of the water is unnecessary, and the colour reaction is quite sufficiently sharp without starch paste.

As a dispensing counter operation a still more handy method is to work with the B.P. tincture of iodine. Measure f℥ss. of the acid to be tested, pour it into a vial, rinse the measure with f℥j. tincture of iodine, and then add three drachms more of the tincture. In this proportion half a drachm of the acid to half an ounce of the tincture the solution should be about colourless, but if still brown add the acid in small-measured portions till the colour disappears, and the total quantity used will indicate how much of the sample in hand will have to be used for each f℥ss. of the acid prescribed.

Sulphite of sodium, though perhaps not in very general use, is in constant use in Newcastle, and will no doubt be of equal importance in some other places. Though more stable than the acid it is sufficiently liable to variation to make a ready mode of its valuation desirable. It is very remarkable that the B.P. does not favour us with instructions for its volumetric determination. Is it of too little importance? We are instructed to determine the value of hyposulphite of sodium by titration—is the sulphite the less important of the two? Even sodium itself is directed to be estimated with the volumetric oxalic acid. What can be the reason that this should be inculcated, and the sulphite neglected? Probably it was just a little kind consideration for the pharmacist—the article is too prone to have shortcomings, and it would be a pity to expose the respectable pharmacist to the attack of the public analyst, as would be done by requiring that his sulphite should be within 5 or 6 per cent. of its theoretical value. Very kind to the pharmacist, no doubt. But what about the patient? Are the patients most likely to suffer by the pharmacist's stock of sulphite or his stock of sodium being at fault? The quality of the sulphite may be very easily determined by checking it with iodine. Resublimed iodine is one of the trade chemicals in the purity of which we have every reason to confide, and the pharmacist's sulphite may be considered quite satisfactory if it be found of equal quality. Take 10 grains of resublimed iodine, throw it into a measure glass or mortar and rub it with a drachm of water, then weigh 10 grains of the sulphite and add the bulk of it to the contents of the mortar, reserving about half a grain; triturate for a moment; the iodine should all dissolve and be nearly decolorized; the addition of the last half grain should totally decolorize the iodine solution if the sulphite be in good condition. If decolorization take place before the last half grain be added the salt has probably lost water by efflorescence, and if the brown colour remains after this addition oxidation is the probable cause of failure. A 5 per cent. variation on either side of theory would be a reasonable latitude to allow for a chemical of this character.

The official statement that the sulphite is "readily soluble in water and *very* soluble in spirit," is open to criticism. The expression seems to imply that the solubility in spirit is greater than in water, which is probably not true of spirit of any strength, and if we are to understand rectified spirit very sparingly soluble or very nearly insoluble would be the correct statement. The U.S.P. says the sulphite is soluble in four parts of cold water and in 0·9 part of

* In a recent paper by Mr. Dougall (*Pharm. Journ.*, Dec. 22, 1888), he gives as the result of the examination of eleven samples, two of them were of the exact official strength. This is a better proportion than I should have anticipated, though on the other hand I am surprised that any tradesman should have supplied him with samples so bad as the three worst he describes.

boiling water, and sparingly soluble in alcohol, U.S.P. alcohol not being absolute alcohol, but alcohol with 9 per cent. of water, as against our rectified spirit being alcohol with 16 per cent. of water, and both statements are probably only copies from sources of information which would take little or no note of the pharmaceutical standards of the strength of spirit. The solubility of sulphite of sodium in water is not so readily determined as that of many other salts, from the fact that it is efflorescent and oxidizable. I find 100 parts of water dissolve 58·5 of the crystallized sulphite at 58° F., and rectified spirit B.P. dissolves it only to about the extent of 1 part in 100,000 roughly. The methods I adopted for determining these two points were as follows:—

Thirty grains of the sulphite which had been recrystallized for the purpose, roughly powdered, dried in blotting paper, and then carefully rubbed fine, was shaken in a vial with fℨss. of water, and more water added by 10 minims at a time, till a total of 50 minims nearly completed the solution. Five minims more so readily dissolved the last portion that it was judged to be enough to take up another grain; this being added it dissolved all but a very small particle in the course of three hours with the thermometer standing at 58° F.

The quantity of sulphite was known accurately as 31 grains, and the water, which had been roughly checked by measure, was now determined by weighing the total solution, and found to be 52·9 grains. The undissolved particle could not exceed 0·01 grains, and consequently involved no error worth noting. In the course of the night the thermometer fell several degrees and a crop of crystals deposited. The solubility is thus evidently much affected by little changes of temperature, but it is not of any great pharmaceutical importance. To determine the solubility in rectified spirit I put a grain of the same powder into a vial with about 200 minims of rectified spirit; the bright crystalline character of the powder as it fell through the spirit was speedily changed, probably from the equivalent of efflorescence taking place, the bulk and density of the powder being apparently diminished. The solution after standing for a day was filtered, and an attempt made to estimate the sulphite in solution by titration with iodine, but the quantity was evidently too small to give anything like satisfactory results. I was therefore obliged to be content with observing the residue left on evaporating a drop of the solution on a microscope slide, in comparison with a residue of known weight, a method which I frequently find convenient for roughly estimating the strength of very dilute solutions. My standards for comparison were made by evaporating four drops of solution of sulphate of calcium upon a slip of microscope glass, the first drop containing 1 of sulphate of calcium in 1000, the other three drops containing 1 in 10,000, 100,000 and 1,000,000 respectively. The residue from a drop of the alcoholic solution of sulphite corresponded most nearly in appearance with the residue consisting of $\frac{1}{100000}$ of a grain of sulphate of calcium. The comparison would have been a little closer had the standard scale of residues been prepared with known solutions of sodium sulphite instead of calcium sulphate, but it is sufficient for my present purpose to show the grounds for my statement that sulphite of sodium is almost insoluble in rectified spirit.

In making a standard scale of residues it is satisfactory to dissolve 1 grain in 1000 of distilled water for the first drop, and to let the drop fall from a lip or tube delivering about 1 grain of solution as a drop; and for the second residue to use one part of the first solution diluted with nine parts of distilled water, but for the higher dilutions there are not many samples of distilled water which are pure enough to leave a residue of $\frac{1}{100000}$ of added salt, not appreciably increased by the impurity which the water itself contains. It is therefore better to make the third and fourth residues by dilutions, made with rectified spirit, from the aqueous solution containing one in ten thousand. Commercial samples of rectified spirit commonly evaporate without visible residue, though the residue, prepared as above, and consisting of one millionth of a grain, upon a clean slip of glass is very evident to the naked eye.

In the process for the detection of sulphurous acid occurring as an impurity, the Pharmacopœia has strayed no less from the straight way, which was simple and easy, and consequently useful. What could be simpler or more reliable for the pharmacist than to put a drop of B.P. tincture of iodine into a dram of acetic acid, and note that it acquires a yellow-brown tint, which would have instantly and entirely disappeared if it had contained so much as $\frac{1}{160}$ of a grain of SO_2? This iodine tint remains conspicuous if diluted with twenty times this quantity of acetic acid, if the colour be examined by looking down the column of liquor contained in a test tube. Surely the detection of one part in 120,000 or 180,000 is delicacy enough for an impurity of no more serious moment than a trace of sulphurous acid in acetic.

Then why this roundabout process of using zinc and hydrochloric acid, and suspending a paper moistened with solution of subacetate of lead for five minutes over the effervescing solution to ascertain if H_2S is being evolved by the reaction?

It looks like the work of an amateur chemist desiring to give a pretty little lesson in chemistry to the intelligent youths of the drug trade. What the pharmacist as a man of business wants, is to ascertain, with as little expenditure of time and apparatus as possible, that his acetic acid does not contain sulphurous acid, and that is clearly proved if the drop of tincture of iodine imparts the well-known iodine tint. And if by any chance the iodine colour disappears he knows that the acid contains either sulphurous acid or some other impurity of a reducing character, which would justify him in sending it back to the maker as not up to pharmaceutical standard. It can scarcely be claimed for the official test that it has a superiority in proving that the impurity present is actually SO_2. If any reducing agent is present SO_2 is by far the most likely, but if by any chance the impurity were a hypophosphite or an arsenite, it cannot be claimed that the B.P. test has a superiority in not detecting them.

Theoretically the delicacy of the iodine test is increased by the use of starch, but the delicacy I have indicated above, the detection of 1 part of SO_2 in 180,000 of acetic acid, which is readily enough effected in a test tube of 5 or 6 inches in length, is sufficient for all ordinary cases, and when by the aid of starch I have pushed the reaction to more highly dilute solutions it appears to lose in

reliability what it gains in delicacy, the instability of the starch iodide appearing to detect reducing agents where they do not exist.

A NEW BASE FOR OINTMENTS.

BY PERCY WELLS.

The use of goose grease as an external application dates from a very remote period, but its odour has hitherto been a drawback notwithstanding its efficacy.

By combining it with cocoa butter (ol. theobromæ) in the manner following, the profession can now prescribe ointments easily liquefied on application, and, what is of greater value, more readily absorbed than any other fatty substance I am acquainted with. In addition the emollient property of this combination exceeds that of any other I ever used. I take 3 pounds of fresh goose fat, which can now be procured at any poulterer's in large quantities and at a very low price, and in an enamelled pan liquefy it until the small quantity of membrane collects into a mass. It is now strained through fine muslin, and while hot I add ½ a pound of cocoa butter which readily dissolves without further heat. These mixed fats must now be stirred continuously until they begin to solidify, when the stirring should be more vigorous until quite cold, and I prefer a wooden spoon to a knife or rod for this purpose.

I send you two samples, one quite plain and the other benzoated, but instead of adopting the B.P. process I use what I consider a superior one, which can be found in the *Pharmaceutical Journal*, page 848, of 1870–1. This preparation of benzoin keeps fats unaltered for many years.

26, *Cambridge Gardens, North Kensington, W.*

NOTE ON SPIRITUS CHLOROFORMI.

BY PERCY WELLS.

I assume the object of the authors of the British Pharmacopœia in fixing a standard for this preparation was firstly to regulate the dose of chloroform, and secondly to mix it with such a quantity of spirit as should prevent it separating when added to water, as the chloric ethers did which contained 1 part of chloroform to 7 or 9 of spirit.

My object in writing on this subject is to point out that instead of using 19 ounces of spirit to 1 ounce of chloroform, if this quantity of chloroform is first mixed with 15 ounces of S. V. R. 60 o.p., and then 4 ounces of distilled water added, a spiritus chloroformi is obtained equal in its therapeutic effects to the B. P. standard.

26, *Cambridge Gardens, North Kensington, W.*

THE ACTIVE PRINCIPLE OF RENNET, THE SO-CALLED CHYMOSIN.*

BY DR. L. H. FRIEDBURG.

(*Concluded from page* 528.)

Hammarsten puts the question: in which part of the mucuous membrane of the stomach is the lab generated? He finds that the pyloric part is much poorer in ferment than the fundus. The stomachs of calves and sheep always showed the presence of lab, while those of the other mammals and birds often failed to contain it. The stomachs of fish hardly ever showed it.*

But it was found that this variable behaviour of the infusions depended upon the more or less strong spontaneous formation of acid, and a continued research taught that the mucous membrane of every animal heretofore studied in this regard, contains a water soluble substance which is not lab, but out of which lab is formed in a short time after addition of an acid. Experiments in this regard were performed with the infusion of a pike's stomach, which, by means of a titrated hydrochloric acid was brought to an acidity of 0·1 per cent. After twelve to twenty-four hours the liquid was exactly neutralized, and a liquid was thus obtained which coagulated milk within a few minutes.

The fact that there exists a substance in the mucous membrane of the stomach which, on addition of an acid yields lab, furnishes an explanation *why* acidulated water produces an infusion richer in ferment than neutral water.

Finally the following statements are made by Hammarsten in regard to the coagulation of milk at acid reaction. An acid infusion of 0·1 per cent. hydrochloric acid was divided in two portions. One-half was heated for some time, using 70°–80° C. in a closed vessel, and, after cooling, five times its volume of new cow's milk was added. This mixture remained for hours liquid at the temperature of the blood, while at the same temperature the non-heated infusion, the same milk in the same proportion, coagulated instantaneously.

This shows that the ferments of the calf's stomach at acid reaction act very energetically; but the question to be answered was still this, is this action, besides being due to the lab, also to be attributed to the pepsin? His experiments permitted him to conclude that pepsin solutions, freed from lab in the above mentioned manner, when neutralized, showed no effect upon milk, while in acid solution there seems to be still a slight action present.

I shall have to show later on that my own experiments have forced me to draw the conclusion that pepsin free from lab, even in acid solution, does *not* coagulate milk.

Since the pure lab is without action upon sugar of milk, or albumen solutions containing sugar of milk, while the impure neutral rennet extract shows this reaction, Hammarsten is justified in concluding that the mucous membrane of the stomach contains a third ferment, which forms lactic acid. And it is possible to prove in a different manner the presence of such a substance. Both pepsin and chymosin (lab) can be destroyed by means of sodium hydrate solution, but the remaining liquid, free from either lab or pepsin, still converts sugar of milk quite energetically into lactic acid. Therefore a third ferment forming lactic acid *is* contained in the mucous membrane of the stomach, and the frequent references to the fact that milk at coagulation turns acid are easily reconciled with these apparently diverging remarks. Because, if we work with a liquid poor in lab, the spontaneous acidulation of the milk, the action of the ferment which forms lactic acid comes into play, and the milk may turn sour before coagulation. But if liquids rich in lab are used, which act strongly and rapidly, so the other ferment has no time to begin its action and the milk coagulates at amphoteric or alkaline reaction.

Hammarsten's conclusions are as follows. The mucous membrane of the stomach contains, beside pepsin, two ferments, the one, lab, the other the lactic

* Read before the American Chemical Society, May 4, 1888. From the *Journal of the American Chemical Society*, May.

* *Journal of the Society of Chem. Industry*, March, 1887, page 191: F. Baden Benger states that Sir William Roberts obtained it from the digestive organs of the fowl, and Baden Benger has extracted it from the stomach of the codfish.

acid forming one. Of these two, only the first named one has a specific action upon casein, while the latter exclusively attacks the sugar of milk. The reaction of this latter ferment only comes into play exceptionally when cheese is formed, and *if* the casein is precipitated by this secondary factor, lactic acid, this is a chemical process non-identical with the formation of cheese.

Within the stomach of the living animal the possibility of a coagulation of milk by means of acid alone seems only to be actually existing in the newly-born animal. Hammarsten found in the stomach of young dogs, one to two days old, neither pepsin nor lab, not even in cases in which the stomachs were filled with coagulated casein and contained a strongly acid liquid.

A considerable length of time after these researches of Hammarsten, a patent was granted to M. Blumenthal in 1886 for the practical and wholesale manufacture of chymosin. The patentee describes his own method of preparation (U. S. Pat., No. 344–433) as follows:—

"I have found that chymosin, the active agent in milk, may be obtained from rennet or the stomachs of ruminants, and more especially that of the calf, which contains comparatively little pepsin, the chymosin preponderating; in the stomach of the pig or sheep, on the other hand, I have found that pepsin preponderates. Hence, if the chief product is to be chymosin, it will be found of advantage to employ the stomach or rennet of the calf as a raw material, and if pepsin is to be the chief product it will be of greater advantage to employ the stomach or rennet of the sheep or pig.

"The treatment of the raw material being the same whether the stomach of the pig or that of the calf or other ruminant is employed, I will confine this description to the treatment of the stomach of the calf with a view to obtaining chymosin as a principal and pepsin as a by-product. The stomach of the calf is cut into small pieces and macerated or digested for about twenty-four hours in a solution preferably of common cooking salt, containing about 0·5 per cent. of salt, kept at a temperature of 30° C., more or less. The solution is then filtered, and a small amount of mineral acid—such as hydrochloric, sulphuric, or phosphoric acid—is mixed therewith in the proportion of about 0·1 per cent. The reaction of the acid on the saline solution gives rise to a thick precipitate of mucous matter, which contains but traces of chymosin and no pepsin, the solution during the acidulation being preferably kept at a temperature of about 20° to 30° C., as at that temperature the mucous matter agglomerates more rapidly or readily, and may in this condition be easily separated from the solution, which is effected only with the greatest difficulty otherwise. The filtered solution is again acidulated to the extent of about 0·5 per cent. of acid and pulverized cooking salt is added until a precipitate of the latter is formed.

"This supersaturated, acidulated salt solution is now brought to a temperature of 25° to 30° C., and kept at this temperature for two or three days under constant agitation, and then allowed to rest for a day or so, the temperature being increased to 30° or 35° C. A separation then takes place in the form of a white flocculent substance, which floats on or in the solution, and may be readily collected on a filter, and then dried at a temperature of about 28° C. The substance separated from the solution is the pure zymotic product called 'chymosin.' It is an amorphous, white, gelatinous substance, greatly resembling aluminium hydrate, is without taste or smell, and soluble in water, forming a limpid or clear solution. It may be kept for years without deterioration, and is not injured by temperatures reaching as high as 35° C. The remaining saline, supersaturated acid liquor or mother liquor free from chymosin, does not cause milk to curdle when mixed therewith, the active agent, chymosin, which alone produces this reaction in milk, having been eliminated. The pepsin held in solution in this mother liquor may now be separated therefrom by neutralizing the solution with an alkali and agitating the same for some time, the pepsin being obtained as a gelatinous precipitate insoluble in the concentrated neutral salt solution, but soluble in the acid salt solution.

"Pure pepsin may also be obtained from the so-called 'impure pepsin essence,' or 'extracts of rennet of commerce,' by acidulating these extracts or the solution of the dry rennet with one of the mineral acids above referred to in the proportion of about 0·2 per cent. of the acid, whereby the impurities are precipitated. These are removed by filtration, an excess of cooking salt added, as described, to separate the chymosin which is collected, and the remaining solution is neutralized to precipitate therefrom the pepsin. In this case, also, chymosin and pepsin are separately obtained free from any albuminous mucous or other impurities."

Here, then, is offered an entirely new way of preparing the active principle for milk coagulation, for which the inventor very aptly uses the name chymosin.

Experiments which I performed myself at different times, working exactly according to the directions of this patent, convinced me of its value. Working on a small scale and using about five calf's stomachs at a time, the preparation of chymosin was performed successfully. The only difference from the results, as stated in the patent, is a very agreeable one, *i.e.*, "that on so small a scale the chymosin is obtained immediately after supersaturation of the acid solution by common salt (NaCl). A snow-white substance accumulates then, floating upon the liquid. It is even preferable at once to skim off this substance from the liquid and to put it on porous clay or a piece of glass, because it easily might be lost in three to four days' consecutive standing of the liquid, either because the small amounts of chymosin obtained sinks down to the surface of the salt, and is thus rendered inaccessible, or because under such conditions it might decompose." I advise the removal of the white surface at once and then letting the liquid stand to see whether the crop will be augmented after a few days, as the patent indicates.

Comparing the reactions that this substance yields with the reagents which Hammarsten used for characterising his lab, I found each and every one reaction to be also correct for Blumenthal's chymosin, so that I am inclined to consider the two substances as identical.

Since I referred above to Hammarsten's remark, that it seemed as if pepsin still and *eo ipso* had a slight power of coagulating milk, I made the following assay. Merck's pepsin was taken and freed from chymosin according to the above-mentioned patent. The resulting pepsin, which was perfectly odourless and dissolved to an almost absolutely clear liquid, digested albumen actively, while in a very slightly acid solution (of HCl) it did not curdle milk within forty-eight hours, and this same milk would always curdle in the shortest time when at the end of the above-mentioned period of the experiment chymosin was added.

It seems, therefore, that according to the patent, the separation of chymosin from pepsin is more thoroughly arrived at than in Hammarsten's fractional precipitation and consecutive heating of the substance to a temperature at which it is supposed that chymosin is destroyed. Besides, it would follow, that under such conditions (the pepsin of Hammarsten actually showing the power of curdling), the chymosin is not fully destroyed.

Pure pepsin, free from chymosin, does NOT *curdle milk according to my experiments.*

On the other hand, I have to confirm the statement that the time of curdling milk by chymosin is shortest in acid solution and longest if the solution is purposely made alkaline.

In regard to the systematic analysis of chymosin products as they are offered to the consumer, I intend to present later, if time permits, a short paper. I only wish here to point out the fact that great care has to be taken in determining the nitrogen, *i.e.*, the albuminoids. If the analysis be performed according to the Kjeldahl method, results are obtained which do *not* permit multiplication of the nitrogen found, by 6·25, to indicate albuminoids. It will almost invariably be found, that the quantity of albuminoids, so calculated, is greater than the total quantity of organic substance, the "loss by ignition." If, on the other hand, the soda lime determination is used, the result of multiplication by 6·25 remains within reasonable limits.

But whether the truth is revealed by the soda lime determination, or whether the chymosin is so constituted as not to permit the ordinary calculation of nitrogen found in it to albuminoids by applying the factor 6·25, remains still a mystery to me. The Kjeldahl method being approved and rendering good service in so many cases, may here be misleading, but we certainly know that the soda lime method is not an infallible one, and thus we stand before the query—does the chymosin belong to the albuminoids proper?

I intend to approach this question by preparing chymosin entirely free from chloride of sodium, etc., which requires time and is by no means an easy matter, and then to perform the nitrogen determination by means of cupric oxide.

CHEMICAL NOTES ON COCA.*

As the value of coca leaves outside of South America depends almost entirely on the amount of cocaine yielded by them, it has been considered desirable to furnish such chemical information as bears directly upon the cultivation of the coca plant in various parts of the colonies and India. In the preparation of this information we are indebted to Mr. Alfred G. Howard, F.C.S., F.L.S., grandson of the late Mr. John Eliott Howard, F.R.S., the well-known authority on cinchona. By the aid of correspondents in the West Indies, Ceylon, India and Java, numerous samples of coca leaves grown in those countries were obtained with full particulars as regards the circumstances under which the plants were cultivated and the methods adopted in drying the leaves. These leaves were carefully analysed by Mr. Howard, and the results are of a very interesting character. They point out not only the best plants to grow, but also the circumstances best suited to produce a high percentage of alkaloids, and the best methods for gathering and curing the leaves.

It is important to point out that the percentages of alkaloids often quoted in regard to coca leaves cannot be compared with one another, owing to different methods pursued in dealing with them. Mr. Howard states that the alkaloid determined in all his analyses "is simply cocaine in a pure state which is split up into crystallizable and uncrystallizable cocaine as nearly as could be done when working with such small quantities."

The following analysis of coca leaves, for convenience of reference, have been divided into four series:—

Analyses of Leaves of Coca.

Localities.	Per cent. Crystallizable.	Per cent. Uncrystallizable.	Total Cocaine.	Elevation.	Remarks.
				Feet.	
A.—Ceylon	0·60	0·00	0·60	2300	Dried in the sun.
,, ...	0·60	0·00	0·60	1500	Dried in the shade } Grown at Botanic
,, ...	0·47	0·00	0·47	1500	Dried in the sun } Gardens, Peradeniya.
British Guiana .	0·22	0·33	0·55	Sea-level	Dried in the shade.
B.—Java	0·30	0·09	0·39	820	Grown at Buitenzorg.
,, ...	0·34	0·09	0·43	3000	,, ,, Sockaboemi.
,, ...	0·24	0·08	0·32	5000	Dried in the sun.
C.—Jamaica . . .	0·33	0·43	0·76	100	Dried in the shade } Plants 6 months old:
,, . . .	0·24	0·16	0·40	100	,, ,, sun } grown at Spring Gardens Estate.
,, . . .	0·25	0·33	0·58	600	Dried in the sun } Plants 5–6 years old:
,, . . .	0·20	0·45	0·65	600	,, ,, ,, } grown at Castleton Gardens.
St. Lucia . . .	0·22	0·33	0·55	Sea-level	Dried in the shade.
D.—India	0·45	0·35	0·80	900	Darjeeling.
,, , . . .	0·27	0·23	0·50	—	Bogracote.
,, ...	0·23	0·20	0·43	—	Alipore: dried in shade 10 days.
,, ...	0·30	0·23	0·53	2200	Ranchi, Chota, Nagpore.
,, . . . ,	0·41	0·17	0·58	2200	,, ,, ,, dried in shade, then rolled and fermented like tea.

In the 'Annual Report of the Botanic Gardens,' Ceylon, for the year 1887, Dr. Trimen, F.R.S., states that the coca plants at Peradeniya, and possibly all the plants now in the colony, have been derived from a Kew plant received in 1870. As there has been only one coca at Kew such plants would necessarily belong to the variety *novo-granatense* already described. The specimens of leaves received from Dr. Trimen for analysis with his letter of February 27, 1888, appear, however, to belong to the typical Peru plant. They are in some cases 3½ inches long and 1½ inch wide; they are oval-pointed, dark green, and correspond very nearly with specimens collected in Peru by Mr. Pearce. The analyses of the Ceylon leaves show exceptional richness in crystallizable cocaine; they have no uncrystallizable cocaine and the total yield is the highest, with two exceptions, of any received. Of the two specimens grown at the Botanic Gardens, Peradeniya, it will be noticed that the leaves dried in the shade yield ·60 per cent. of cocaine, while the same leaves dried in the sun yield only ·47 per cent. Leaves grown in Ceylon at 1500 feet and 3000 feet respectively show the same results. The difference of elevation has apparently not produced any effects on the yield in cocaine.

The leaves received from British Guiana are not

* From the Kew 'Bulletin of Miscellaneous Information,' January, 1889.

distinguishable in general characters from the Ceylon leaves. They are perhaps less coriaceous, but have the same dark green colour on the upper surface and are quite as large. The yield of cocaine is somewhat less, but while in the Ceylon leaves there is no uncrystallizable cocaine, in the British Guiana leaves the amount is ·33 per cent. If it should be proved that this is a highland plant it would not be likely to be so productive in alkaloids at sea-level in the tropics.

The Java leaves represent coca grown at 800 feet, 3000 feet, and 5000 feet respectively. They belong to the intermediate forms provisionally classed as Bolivian with narrowly oblong leaves, pointed, dark green above and glaucous beneath. They contain chiefly crystallizable cocaine, the result of the most favourable sample yielding ·34 per cent. crystallizable cocaine and ·09 per cent. uncrystallizable cocaine. The leaves grown at an elevation of 5000 feet show a less favourable result than those grown at either 800 feet or 3000 feet. This may be owing in part at least to the fact that they were dried in the sun. Mr. Howard states that the Bolivian leaves which usually reach this country from South America contain ·40 per cent. of crystallizable cocaine and ·05 of uncrystallizable.

The plants grown at Jamaica and St. Lucia are characteristic of the variety *novo-granatense*. They are all apparently derived from the Kew plant. The leaves are obviate, blunt, or emarginate, and membraneous, and of a light grassy green colour when dry. In one instance the total yield in cocaine is exceptionally high. This occurs in leaves forwarded by the Hon. W. B. Espeut grown at Spring Garden Estate. The larger proportion of the cocaine is, however, uncrystallizable. These leaves were from plants only six months old grown at nearly sea-level and dried in the shade. The same leaves dried in the sun appear to have lost ·36 per cent. of cocaine. Leaves grown at the Castleton Gardens at an elevation of 600 feet, in perhaps less rich soil, yield ·65 per cent. of cocaine, of which ·45 per cent. is uncrystallizable. A good series of such leaves were obtained from Mr. W. Fawcett, F.L.S. There is apparently a considerable difference in the yield of cocaine in leaves gathered at different seasons in the year. This may account for the different yield of plants grown at sea-level in Jamaica and exactly similar plants grown at sea-level at St. Lucia. In the one case the yield is ·76 per cent. of cocaine, in the other it is only ·55 per cent. The general conclusion would point to the variety *novo-granatense* as being a lowland plant capable of growing in hotter conditions than those suitable to the type. Leaves taken from plants grown at Kew yielded ·44 per cent. of cocaine, of which ·10 per cent. was crystallizable. Of leaves grown in India one sample forwarded to Kew by Mr. Sackville Cresswell, grown at Darjeeling at an elevation of 900 feet, gave the highest percentage of total cocaine, but a large proportion was uncrystallizable. The other leaves forwarded by the Secretary of the Agricultural and Horticultural Society of India have been already very fully discussed by Dr. Warden, M.D., F.R.C.S., in a "Note on *Erythroxylon Coca* Grown in India," published in vol. viii., part III., new series of the Journal of the above Society.

An interesting point connected with these leaves is brought out by Mr. G. Peppe, of Ranchi, Bengal. One set of leaves, dried in the sun, yielded ·53 per cent. of cocaine, of which ·23 per cent. was uncrystallizable. The same leaves "dried in the shade on cloth for twenty hours, then rolled by hand like tea, then fermented two and a half hours, dried over a charcoal fire and put in a closed tin box," yielded ·58 per cent. of cocaine, of which only ·17 per cent. was uncrystallizable. These latter leaves were obtained from plants imported from Paris; the other Indian leaves were from plants introduced by the Agricultural and Horticultural Society of India. In general character they are all very much alike, approaching the Bolivian form perhaps in shape and colour, but evidently possessing the characteristics of Truxillo coca in the high percentage of uncrystallizable cocaine contained in them.

The above results confirm the opinion already formed that there are several varieties of *Erythroxylon Coca* existing in South America, some of which have been now introduced into the Old World. These varieties have no doubt their own range of elevation at which they may be successfully cultivated, as well as characteristics more or less marked in the yield of crystallizable cocaine.

The typical plant appears to be the best plant to cultivate at higher elevations, and if the object is to obtain a large yield of crystallizable cocaine. The variety *novo-granatense* thrives at sea level in the tropics, and yields nearly, if not quite, as high a percentage total cocaine, but a large proportion of it under present chemical methods is uncrystallizable. The latter plant, judging from cultivated specimens in this country, appears to yield a larger crop of leaves than the type, but fruits somewhat sparingly.

As regards yield of crystallizable cocaine we have apparently amongst coca plants very much similar conditions as amongst cinchona plants. In the latter, *Cinchona succirubra* yields a large proportion of total alkaloids like the variety *novo-granatense*, but only a small amount of crystallizable quinine. On the other hand, *Cinchona calisaya* (like the typical coca plant) yields a smaller total of mixed alkaloids, but a larger yield of crystallizable quinine.

Other Species of Erythroxylon.

There are numerous other species of erythroxylon distributed throughout the inter tropical regions of both hemispheres. The headquarters of the genus is in tropical America, whence more than one hundred species have been already described.

The important properties which exist in the leaves of *Erythroxylon Coca* have naturally drawn attention to other species, in the hope that their leaves might contain the same or similar principles. It is well known that the wood of numerous species is hard and yields a red dye. The young shoots of *Erythroxylon areolatum*, a native of Jamaica and of the northern parts of South America, are said to be a mild stimulant; the bark is a tonic, and the juice of the leaves is used externally against herpetic affections.

Erythroxylon monogynum (Sethia indica), a native of the East Indies, known under the Madras native name of *Gadara*, possesses a timber that is slightly fragrant, and Ondaatje records that a creasotic oil has been prepared from it. The leaves of this plant were used by the natives of India to mix with their food during the last famine.*

During the course of the present inquiry an effort has been made to procure as many samples as possible of leaves of various species of erythroxylon in order that they may be analysed by the same method as that adopted for the coca leaves. It might be naturally supposed that the two species already mentioned (*E. arcolatum* and *E. monogynum*) which have gained a local reputation for medicinal properties would contain the larger amount of the characteristic coca alkaloids. The leaves of *Erythroxylon arcolatum*, grown in Jamaica, received from Mr. Fawcett, and dried in the shade, contained ·033 per cent. of cocaine, while similar leaves dried in the sun yielded ·023 per cent. of cocaine. Leaves of *Erythroxylon coca* from the same island have already been shown to contain ·76 per cent. of cocaine—so the quantity yielded by the indigenous plant is therefore only about one twenty-fourth part of that yielded by *E. Coca*.

No leaves of *E. monogynum* were obtainable for Mr.

* Official papers of the Government of Madras, Rev. Depart., 29th Sept., 1885. No. 1105.

Howard, but reference may be made to an analysis undertaken by Dr. Warden of leaves obtained in Calcutta which "yielded ·04 per cent. of a principle which, however, did not possess the physiological properties of cocaine."*

At the Botanical Gardens at Java, Mr. Eykman, formerly Professor of Chemistry and Pharmacology at the University of Tokio, carried on researches into the properties of local species of erythroxylon, which are fully borne out by the analysis of Mr. Howard with similar leaves sent to Kew by Dr. Treub. Mr. Eykman analysed the leaves of *Erythroxylon montanum*, *E. laurifolium*, and *E. retusum*. The amount of alkaloids found in them was in no case higher than one-tenth of that contained in the leaves of *E. Coca*. The bark of *E. montanum* and *E. retusum* contained an inappreciable amount of alkaloids, while the fruit contained only a trace.† The Java leaves analysed by Mr. Howard contained the following percentages of alkaloids: *E. montanum* ·03 per cent., *E. laurifolium* ·05 per cent., and *E. retusum* ·03 per cent.‡ The highest percentage reached by leaves of *E. Coca* received from Java (already noted) was ·43 per cent. Hence, according to these figures, the indigenous species yielded only one-ninth to one-fourteenth of the alkaloids yielded by *E. Coca*. Leaves of *E. macrophyllum* received from Mr. Jenman, Botanic Gardens, British Guiana, contained not a trace of alkaloids, while the leaves of *E. ovatum* yielded ·02 per cent. of alkaloids. The latter species is found in many of the West India Islands as well as in South America. It is known at Dominica as *Bois vinette*. A specimen in the Kew Herbarium, collected by Lechler in Peru in 1854, and named by Grisebach *E. ovatum*, was marked "culta sub-nomine coca, San Govan." From the character of this specimen there could be little doubt that it was only a form of *E. Coca*, and the amount of alkaloids contained in the leaves would have fully justified its being accepted as the true thing.

To summarise the results obtained from an examination of the leaves of local species of erythroxylon, it is pretty clear that no species yet examined yields alkaloids at all comparable in quantity to those found in *E. Coca*. The bark of these species appears to contain even less than the leaves, while the fruit and seed contain only a trace of alkaloids. The following table will show the results as far as they are now obtainable.

The yield of *E. Coca* is placed at the head of the list for comparison :—

Species.	Per-centage of Alkaloids.	Habitat.
Erythroxylon Coca .	0·760	Grown at Jamaica.
,, *areolatum* . .	0·033	Jamaica; dried in shade.
,, ,,	0·023	Jamaica; dried in sun.
,, *macrophyllum*	0·000	British Guiana.
,, *ovatum* . . .	0·020	,, ,,
,, *montanum* . .	0·030 ?	Java.
,, *laurifolium* .	0·050 ?	,,
,, *retusum* . .	0·030 ?	,,
,, *monogynum* .	0·040	India.§

* "Note on *Erythroxylon Coca* Grown in India," by C. J. H. Warden, M.D., F.R.C.S., reprinted from *Journal Agrt.-Hort. Soc. India*, vol. viii., Part II.

† 'Annales du Jardin Botanique de Buitenzorg,' Dr. M. Treub, Directeur, vol. vii., Part II., pp. 224-229. Leide, E. J. Brill. 1888.

‡ Mr. Howard states that these results are not quite free from doubt. They are, however, very near those obtained by Mr. Eykman, and give almost identical proportions as compared with *E. Coca*.

§ Analysis of Dr. Warden.

NOTES UPON LIVER OIL.*

BY DR. HEYERDAHL.

One of the most characteristic properties of liver oil is the easiness with which it splits up, and it is in this property that its therapeutic value lies, rather than in the amount of iodine, gaduine, methylamine and free acid. This inclination to decompose, however, increases considerably the difficulty of a chemical examination of the product. Moreover, it allows of no certain chemical knowledge as to the absolute genuineness of a sample, which also much increases the difficulty of the work, as very few are in a position to work with materials prepared by themselves. This explains how it is that mixtures of different kinds of liver oil cannot be recognized with certainty by means of reagents, and that empirical estimations play the largest part in connection with it. As the chemist of one of the most important steam liver oil factories in Norway, Dr. Heyerdahl has undertaken the working out of this subject. The investigation will presumably last several years before conclusive results will be obtained.

From 400 kilograms of steam cod-liver oil there were prepared in the University Laboratory, Christiania, stearic acid, with a constant melting-point at 69° C.; palmitic acid, with a small quantity of other fat acids, bringing the melting point to 62° C.; oleic acid; glycerine; gaduine (originating in the secondary decomposition of some substance as yet unknown); iodine (up to 0·0002 per cent. contained in liver oil); as well as traces of bromine. After being heated in a retort, carbonic acid was passed through and then absorbed in hydrochloric acid. To the distillate platinic chloride was added, and in this way the double salt of trimethylamine was obtained in crystals. In renewed experiments no trimethylamine was found, on which account it is assumed that it was a secondary product. Volatile acids were detected, but in so small quantity that 400 kilograms of oil did not suffice for their preparation.

For the determination of quantities of free fat acids in fatty oils Dr. Franz Hofman's method,† with rosolic acid as an indicator, is suited (1:1000 in alcohol). The quantity of cod liver oil used in an experiment varied between half to seven grams, according to the amount of free fat acids. The oil was dissolved in 20 to 40 c.c. of perfectly neutralized ether, more ether being added in case of fat separating upon titration, and it was titrated with potash. The influence of the duration of the melting of the liver and the degree of temperature is shown by the following tables :—

Series 1.

Sample No.	Heated minutes.	Temperature ° C.	Acid number.	Oleic acid per cent.
1	20	62	0·76	0·39
2	45	70	0.66	0·34
3	60	80	0·61	0·31
4	80	85	0·58	0·30

The heating was discontinued and after 50 minutes renewed.

5	110	87	0·57	0·29
6	145	90	0·58	0·30

Series 2.—*The same samples, but carried out when the oil was one year old.*

1	50	56	0·99	0.51
2	85	73	0·97	0·50
3	100	83	0·88	0·45

Consequently, instead of the expected increase of free acid, as a result of heating, the opposite had taken place. The reason of this might be that at the commencement of the melting volatile acids were found, which were driven off by the longer heating at a higher temperature; or that the fat first melted was richer in

* *Chemiker Zeitung*, November 3.

† *Beit. z. Anat. und Physiologie*, 1874.

fat acids; or finally, that both the volatile and the fat acids were present in larger quantity. In order to clear up this point all the samples were heated on a water-bath, and air drawn through :--

Series 3.

Sample No.	Heated minutes.	Litres of air drawn through.	Acid number.	Oleic acid per cent.
1	0	0	0·78	0·40
1a	30	20	0·81	0·42
1b	90	62	0·81	0·42
1c	210	134	1·0	0·51
1d	330	204	1·16	1·60

Series 4.

2	0	0	0·86	0·44
2a	30	20	0·77	0·39
2b	90	59	0·82	0·42
2c	210	153	1·0	0·51
2d	330	257	1·35	0·69

Series 5.

3	0	0	0·67	0·34
3a	30	27	0·65	0·33
3b	90	65	0·69	0·35
3c	210	133	0·82	0·42
3d	330	176	1·05	0·54

Series 6.

4	0	0	0·63	0·32
4a	30	23	0·65	0·29
4b	90	45	0·63	0·32
4c	210	138	0·81	0·42
4d	330	229	1·16	0·60

Series 7.

5	0	0	0·81	0·42
5a	30	25	0·69	0·35
5b	90	52	0·75	0·38
5c	210	128	0.91	0·47
5d	330	207	1·22	0·63

Series 8.

6	0	0	0·53	0·27
6a	30	16	0·53	0·27
6b	90	56	0·56	0·29
6c	210	136	0·90	0·46
6d	330	205	1·03	0·53

These series of experiments, represented graphically, indicate that during the first thirty minutes the quantity of acids diminishes, and that by longer heating the acid contents rise regularly, so that the rising curves run parallel.

Liver oil prepared by direct treatment of the liver with steam appears to contain no volatile acids.

Liver oil heated upon a water bath with free access of air gives a somewhat lower curve.

Series 11.

Sample No.	Heated minutes.	Acid number.	Oleic acid per cent.
1	0	0·68	0·35
1a	15	0·70	0·36
1b	30	0·71	0·36
1c	45	0·73	0·37
1d	105	0·73	0·37
1e	165	0·75	0·38

Liver oils prepared from livers seven days old gave the acid number 1·75 (0·90 per cent. of oleic acid); consequently, three times as much as from fresh liver.

The free fat acids, which furnish the basis for rancidity in butter, for instance, are not, as shown by the foregoing series of experiments, the cause of the rancid taste and odour in liver oil. None of the first or the second series were rancid, and yet the acid number varied from 0·57 to 0·99. Of series 3, 4, 5, 6, 7 and 8 all probably were rancid as soon as the heating had been maintained thirty minutes. In order to investigate more closely whether rancidity is independent of the amount of free acids, liver oil was saponified, the acids again separated, and added to other liver oil in quantities of 2, 1½, ¼ and ⅛ per cent. All the samples so treated were free from rancid odour; those richest in fat acid had a sharp taste, which could not, however, be called rancid. It would appear that the causes of rancidity are more probably to be ascribed to special conditions, as the influence of light or heat. Liver oil kept well enclosed remains unaltered.

	Acid. number.	Oleic acid per cent.
Liver oil from 1884	0·73	0·37
,, ,, 1885	0·74	0·38
,, ,, 1886	0·72	0·36
,, ,, 1887	0·70	0·36

An examination was made of some samples of liver oil that passes in commerce under the name "Crude Medicinal Liver Oil" ("*Röher Medicinalthran*"). The quality of this differed considerably in respect to colour, odour and taste.

Crude Medicinal Liver Oil.

	Acid number.	Oleic acid per cent.
The palest	7·38	3·79
Somewhat darker	7·55	3·87
The darkest	7·72	3·96

Liver Oil for Technical Purposes.

Bright oil	21·20	10·9
Brown oil	54·4	28

These varieties, produced under fermentation, contain considerable quantities of free acids quite in contrast to the steam medicinal liver oils.

Other kinds of liver oil examined were—

	Acid number.	Oleic acid per cent.
From the liver of *Gadus virens*, Sey.	0·34	0·17
,, ,, *Brosmius Brosme*	0·15	0·08
,, ,, *Molva vulgaris*	8·51	4·36
,, ,, *Raja radiata*	9·34	4·80
,, ,, *Lamna cornubica*	5·10	2·62

It is worthy of remark that all these samples were free from rancid odour and taste.

IS IT ADVISABLE FOR THE PHARMACIST TO PREPARE HIS OWN FLUID EXTRACTS?*

BY D. S. WHITE.

In preparing a paper treating on the question of the advisability of the pharmacist preparing his own fluid extracts, I shall aim to give you the results of my own observation and experience, covering a period of several years, and a careful study of the subject.

In doing this I expect to hear of the great reliability of certain manufacturing chemists—a thing I know as well as anyone, and I esteem them all highly for the high character of their manipulations, while I am not prepared to admit that a greater amount of careful attention can be given a large product than a smaller amount, and that one pharmacist is so much better qualified than another can be. I am now manufacturing a line of 128 different kinds of fluid extracts, and will give the outline of the manipulation and the result.

The percolator is a galvanized iron cylinder 6 inches in diameter and 12 inches long, with a head strongly soldered in at one end, a cover to fit the opposite end and a tube 1½ inches long extending from the centre of each head.

* Read at the Huron meeting of the South Dakota Pharmaceutical Association. From the *Druggists' Circular and Chemical Gazette*, January.

To pack the percolator, remove the cover, insert the upper diaphragm, which is made of perforated tin, and cover with a cloth wet in the particular menstruum to be used. Pack the drug, previously ground to a moderately coarse or fine powder, according to the nature of the drug, and moistened with the menstruum to be used. Pack firmly and insert the lower diaphragm with a cloth covering it moistened in the menstruum. The lower diaphragm has a cone screw which throws out three arms which press against the inner surface of the percolator, holding it firmly in place. Press this diaphragm firmly on the drug, and with the key turn the cone screw until the arms press the inner surface of the percolator, holding the drug in a solid compact mass. The drug as it swells will make a very solid mass, and at the end of the operation no tincture press will be needed. Now put on the cover and reverse the percolator, hang it on a hook and connect the end of a rubber tube 8 feet long on the tube of the percolator. Hang a reservoir for the menstruum on the ceiling above and connect the tube at bottom with the other end of the rubber tube connecting with the percolator and regulate the flow of menstruum by a check clamp on the tubing. When a few drops have passed, close the clamp on the tubing so that no liquid or menstruum can flow to the drug and let it stand twenty-four hours, or longer, then regulate the flow so that it shall only drop from the percolator. It will be seen by this that the drug is under very strong pressure ,and the lateral pressure forces the menstruum through the mass. The aqueous portion expands the fibrous parts, while the alcohol penetrates the cell containing the medicinal properties of the drug, the lateral pressure causing it to give place to successive portions until the drug is exhausted. The menstruum must be aqueous or alcoholic, according to the nature of the drug. The menstruum of wild cherry bark is alcohol 6, water 12 ounces. Rhubarb is alcohol 10, water 8 ounces. Orris root is alcohol 12, water 6 ounces. Lupulin is clear alcohol. You will observe by this that I have given examples of menstruum from 6 ounces of alcohol to the pint of finished extract of clear alcohol to show the difference in the character of the drug and how to effect complete exhaustion.

The principle on which this percolator acts is not new—in fact lateral pressure is very old, but the utility of its application in making a saturated extract, cannot be denied. This, in short, is the plan I use in making fluid extracts, and by re-percolating with the same menstruum several times, the medicinal properties are displaced and a saturated extract is the product.

With the exception of stramonium, celery seed and a few others of like character, one pint of menstruum does not exhaust the drug, and you will obtain easily on an average, 2 pints to the pound of drug, and in some even more, no matter how far you carry re-percolation ; and in no way is it possible to get the entire medicinal properties of most drugs into one pint of menstruum at any ordinary temperature without employing heat.

All authorities now argue that heat disturbs, if not destroys the chemical combination of the constituents of most drugs, and cannot be correctly applied. Wild cherry bark, for instance, with a volatile acid among its active constituents, would not supply the same medicinal product with heat used to evaporate it as without, and so it is with many, if not all other drugs.

The manipulation, with a thorough knowledge of the character of the constituents of the drug to be acted on, whether to use an aqueous or alcoholic menstruum is easily suggested, and a beautiful, as well as a perfectly reliable fluid extract will be the result, and one in every way the equal of the product of any laboratory in this country. Fluid extracts assayed contain on an average of 90 to 100 grains of solids to the fluid ounce, but this is no criterion of the strength of the extract in the medicinal properties required in a certain case. The strychnine in nux vomica, the atropine in belladonna, etc., are the properties wanted, but you find that different samples yield from 2 to 4 per cent. of strychnine in nux vomica, and in belladonna the atropine is equally variable, but you are told that a drop of the fluid extract represents a grain of the drug, which of course represents the same variation of the salt required that the drug itself represents. While Mayer's reagent may precipitate the total solids and ether dissolve certain of those solids, it is then purely a matter of guesswork what is really dissolved in the precipitate and what remains undissolved. I believe, then, that every good druggist can make his own fluid extracts as well as any one, and as near a standard strength. As far as I have been able to learn, no manufacturer now uses heat to evaporate the extract, and then, of course, all that can be done is to perfectly saturate the menstruum, whatever amount it may take to do it. Why, then, should we longer believe that we have not intelligence enough to perfectly saturate a menstruum with a drug when you employ lateral pressure and pressure of the drug. Try it once and be convinced that you can do it as well as any one, and that it will pay you a very large return to do so. It takes very little time.

As to the cost of manufacturing fluid extracts, the cost of 1 pound of drug ground for percolation ranges from 20 cents to 1 dollar per pound, with a bulk of the crude drug averaging 30 cents per pound, and most drugs will average 2 pounds of fluid extract to 1 pound of the drug to thoroughly exhaust the drug. A menstruum at an ordinary temperature can only contain the medicinal properties of the drug to saturation, and if the drug fully saturates 32 ounces of menstruum we have 2 pounds of fluid extract as good as it is possible for any one to make it without heat. Now, if heat be employed, we drive off the active volatile principle, break up the atomic and molecular combination which nature has so wisely combined in proportions exactly suited to the uses intended for correcting the abnormal action of an organ in disease, and while the practitioner is relying on a specific principle in chemical combination in the medicine it is not there; it is volatilized, and his patient is walking the "golden streets." Again heat, in certain cases, no doubt, breaks up the molecules by setting one or more elements free, which may liberate the other elements of the molecule, which changes the entire character of the compound or very much modifies it.

It is not my purpose at this time to enter into a discussion of this subject, but suffice it to say that our best pharmacists agree that heat does this to a greater or less extent, and is therefore objectionable, and a menstruum which is fully saturated represents the drug in a sufficiently concentrated form, and more especially since rectal medication has been found to answer as well as per mouth, and the frequent divided dose has found so many adherents in all sound schools of medical science.

Fluid extracts can be made in no way that I know of except by the percolation I have described above with strong pressure on the drug and lateral pressure through the drug, and as an example of the cost by this process I will take wild cherry bark, and the cost will be as follows :—

1 lb. wild cherry bark	20 c.
12 ozs. of alcohol	25 c.
2 bottles	13 c.
Total	58 c.

This will be 29 cents per pound it costs the druggist to make it, while the market price with the freight is

85 cents per pound, a profit of 300 per cent. for his work in making it besides his retailer's profit. This rule will hold good through the entire list, and you will have a fluid extract that cannot be excelled by any laboratory, while you may find some in the markets that will not reach this standard therapeutically or by any of the well-known physical tests.

Now, gentlemen, I think I have briefly shown you that it does pay to make your own fluid extracts if you will be satisfied with a profit of 300 to 500 per cent., besides the retailer's profit of about 300 to 500 per cent. more, if your practitioner will only be fairly liberal in his prescriptions with aqua fontana or syrupus simplex. You will find you will have as good a product as you can find in the markets to-day, if not better, and your practitioner will find the characteristic effect of the drug as satisfactory as any other makes our markets afford.

CINCHONA CULTIVATION IN COLOMBIA.*

The cultivation of the cinchona tree on a large scale in Colombia is rather a dream of the future than an accomplished fact; though the eminent suitability of the soil and climate in those districts where it was originally found wild are almost a guarantee for its success when attempted. In 1884 the Government of the Republic passed a law for the purpose of promoting the plantation of cinchona, indiarubber, cacao, and eucalyptus trees. This law authorized the President to award prizes for the plantation of cinchona trees at the rate of 1000 dollars for each 10,000 trees, to be payable when the trees had arrived at the age for cropping. The trees to be planted were required to be of certain species, namely, *C. Ledgeriana*, *C. officinalis*, *C. lancifolia*, and *C. pitayensis* (the two latter being the best indigenous sorts). Certain smaller prizes were also to be given for the plantation of caoutchouc trees, and especially of a native species called in this country "caucho virgen," which grows in the cold country from 6000 feet upwards. The President was also authorized to purchase up to 1,000,000 trees for distribution to intending planters. This law has remained a dead letter, however. No prize has been awarded under its provisions, and no new plantations have been made since it was passed.

There are three important cinchona plantations in Colombia at present. The oldest is near the village of Colombia, in the south of Tolima, belonging to the Compañia de Colombia, a company which for many years exported large quantities of the bark of the native *C. lancifolia* whilst the supply of wild trees held out. Their plantation is composed of 80,000 trees, all *C. lancifolia*, and is situated exactly where the wild trees formerly grew. They have lately sent small quantities of the cultivated bark to Europe, and the quality is pronounced to be fine, with about 6 per cent. of quinine. Another plantation, also in Tolima, at Chaparral, on the Central Cordillera, has 450,000 trees, from one and a half to five years old, many fit for cropping. The owners have secured the services of Mr. Robert Thomson, formerly Superintendent of the Botanical Gardens in Jamaica, to manage the plantation. The trees there are of various sorts, including *C. Ledgeriana*, *C. succirubra*, *C. officinalis*, etc., besides the native species. The following analyses of specimens of bark from the Chaparral Company's plantation, made by Mr. D. Howard, show that the barks cultivated in Colombia compare well with the average of those of any other country, excepting, perhaps, the choice Java Ledgerianas.

These analyses, considering the age of the trees, give very good promise.

* From a Consular Report on the Agricultural Condition of Colombia.

	Sulphate of Quinine.	Quinine.	Cinchonidine.	Cinchonine	Quinidine.
1. *C. Ledgeriana*, 3 years old, grown at 8000 feet . . .	4·33	3·24	0·66	trace	0·20
2. *C. succirubra*, 3 years old, grown at 7500 feet . . .	5·00	3·75	3·03	0 17	0·07
3. *C. succirubra*, 3½ years old, 8 months renewed without moss, grown at 7500 feet .	7·00	5·25	1·90	0·67	0·06
4. New species from Ecuador, not named	5·70	4·28	0·43	—	—
5. *C. Thomsoniana* (named provisionally), 2 years old, 8 months renewed without moss	3·30	2·48	0·07	0·55	0·25
6. *C. officinalis*, 3½ years old, grown at 8000 feet . . .	4·66	3·49	0·21	0 06	0·05
7. *C. officinalis*, 8 months renewed with moss	4·30	3·22	0·23	0·07	0·07
8. Jamaica hybrid, 3½ years old, grown at 7500 feet . .	3·12	2·34	2·46	0·62	0·02
9. *C. Ledgeriana*, 22 months old, grown at 7500 feet . .	2·71	2·03	0·55	0·13	—

The third plantation is near Bogotá, but I have been able to procure no details respecting it. These companies have exported little cultivated bark as yet, owing to the low price of quinine in Europe, and are waiting in expectation of a possible rise in the price.

Of the two indigenous species, *C. lancifolia* and *C. pitayensis*, cultivated in the country, the former is the more valuable from the amount of quinine it contains, but it contains only a small quantity of other alkaloids. The *C. pitayensis*, on the contrary, is not very rich in quinine, but it is the richest known bark in the valuable alkaloid quinidine; it is, in fact, the only variety containing quinidine in anything like considerable quantities. Analyses made by Mr. Howard of Pitayo bark have shown from 2 to 3·75 per cent. The Chaparral plantation is close to the district in which the *C. pitayensis* tree originally grew.

The best altitude for the cultivation of the valuable barks in Colombia is from 6000 to 8500 feet, in a temperature of 56° to 62°. The tree producing the Cuprea bark (*Remijia purdieana*),* and which grows as low as 2000 feet, is not worth cultivating. The large exportation of this bark in 1881–83, which somewhat disturbed the minds of the planters in India and Ceylon, has nearly ceased. It was profitable only so long as the tree existed wild in large quantities within easy reach of the Magdalena river, and whilst the price of quinine was high. The allied species, *Remijia pedunculata*,* which is to be found in considerable quantities on the slopes of the mountains bordering the llanos, has not been largely exported, owing to the cost of transport.

Various sorts of trees producing caoutchouc, mostly castilloas, are indigenous to Colombia, but only one sort is cultivated, and that, at present, to a very small extent. This is a hitherto undescribed species of the family of the Euphorbiaceæ, allied to the Ceará and the Hevea of Brazil; but it grows at a greater elevation than any of the Brazilian species. In Chaparral there is a plantation of 70,000 trees, at 6500 feet, which are doing well. They are ready for tapping in six years from the time of planting.

Eucalyptus trees have been largely planted during the last twenty years in many parts of the country, especially on the savana of Bogotá. *E. Globulus* is the species which has been most planted, though others, such as the *E. citriodora*, *E. rostrata*, and *E. saligna* have been tried. Many attempts have been made to introduce some species of the tree into very hot districts, such as Carthagena and some parts of the Magdalena valley, but I believe without success.

* The botanical names of these trees have evidently been transposed.—Ed. Pharm. Journ.

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COCA AND COCAINE.

THE 'Bulletin of Miscellaneous Information' periodically issued by the authorities of the Royal Gardens, Kew, is a publication that has probably a very limited circulation as compared with the value of its contents, though it frequently contains matter that is not only in the highest degree interesting, but also very useful. The number for January, for instance, contains an excellent article upon the coca plant, which has lately become of importance as the source of material from which cocaine is manufactured, and as it gives some useful chemical information bearing upon the cultivation of the coca plant we have extracted that portion which will be found at page 569 of the present number. In the article referred to the early history of the coca plant is briefly given, and it is curious to note that it has been known to and described by European botanists and travellers for more than three hundred years. The original home of the coca plant in South America has not, according to DE CANDOLLE, been very clearly defined; he states that most of the authors who examined it had only seen cultivated specimens, and there is some doubt about those supposed to be wild by PŒPPIG and ANDRÈ, while TRIANA does not admit the species is wild in New Granada. At present coca is cultivated to a very large extent in the Andes of the Argentine Republic of Bolivia, Peru, Ecuador and New Granada. It is also cultivated in the mountainous parts of Brazil. The largest plantations, called locally *cocals*, are said to be in the province of La Paz in Bolivia. In a good harvest the yield of coca leaves is estimated by WEDDELL to be about 900 pounds per acre. The total production is stated to amount to something like 40,000,000 pounds. There are many points of difference between the coca plants grown in different parts of South America, resulting no doubt from seminal variation and the influences of soil and climate. Similar differences appear to obtain in regard to the amount of cocaine in the leaves, as will be seen from the chemical report on coca in the present number. Thus, for instance, it is there suggested that the plant yielding small pointed pale green leaves is the best to cultivate at high elevations and if the object be to obtain a large yield of crystallizable cocaine. On the contrary, the variety yielding leaves rounded at the apex thrives at the sea level in the tropics, but a large proportion of the alkaloid they contain is uncrystallizable.

In the Andes the coca plant succeeds best in the mild but very moist climate of the lower mountains, at an elevation of from 2000 to 5000 feet. Like coffee, it thrives best on slopes where the soil is rich in humus and the drainage good. Shade is said to be unfavourable to the development of alkaloid in the leaves. In Peru the plants yield the first crop of leaves three years after planting, but in poor soils they are often left until the fifth year. The full-grown shrub yields a harvest every 13 or 14 months, but in many plantations the collection of leaves goes on throughout the year, since the ripeness of the leaf depends much upon the soil and situation as well as the age of the plant. In some localities two or three good crops are gathered in the year. The ripeness of the leaf is proved by its breaking when bent in the hand, and the largest as well as most mature leaves are sought for as containing most of the alkaloid which renders coca leaves a marketable product. The leaves are usually dried in the sun and then allowed to undergo a slight sweating in heaps. When the drying is rapid the leaves have a beautiful bright green colour and are quite smooth. Such leaves fetch a high price in South America, while the brown leaves that are more slowly dried are cheaper. But it is important to bear in mind that the estimate of value formed by the South American Indians may be based upon facts very different from those which would influence the manufacturing chemist. Thus Dr. RUSBY points out that the amount of cocaine probably forms no element of the Indian's estimate of the quality of coca, any more than the percentage of nicotine would establish the quality of tobacco. It is probable therefore that sufficient attention has not yet been given to ascertaining the conditions of drying that would be most favourable to the production of a good raw material for the manufacturer of cocaine. This is a point that is eminently deserving of careful inquiry and the very irregular quality of the crude cocaine imported from South America proves that there is great need of better knowledge of this matter. Some of the best samples of this crude product will yield as much as 70 per cent. of true cocaine, but others yield very much less and some scarcely any. Since the manufacture of this crude product in South America the demand for coca leaves has fallen off so much that it is doubtful whether there is any inducement to cultivate coca in any of the tropical colonies for export to this country, but the question is one that can scarcely be decided in the present state of knowledge as to the means by which a good yield of cocaine of good quality is best to be ensured.

COBALT AND NICKEL.

It is reported that a German chemist has been successful in decomposing the metals cobalt and nickel, and that he has found in both a common constituent which alters the colour of cobalt and nickel salts as hitherto known, the colour of pure cobalt salts being violet, and that of pure nickel salts dark green. At a recent meeting of the Munich Chemical Society Dr. Krüss described the researches which had led him to these results. The problem which at first engaged his attention was the more accurate determination of the atomic weights of cobalt and nickel, and the method proposed by Winkler was selected for that purpose. After determining the atomic weight of gold as 196·64, a weighed quantity of cobalt or nickel was treated with a neutral solution of gold chloride and the gold eliminated was weighed. The results thus obtained did not give any constant equivalent proportions, although the greatest care was taken to ensure accuracy. After endeavouring in various ways to detect possible sources of error, without success, the gold separated in these experiments was examined, and it was then found that when dissolved in nitrohydrochloric acid, and precipitated by means of sulphurous acid gas, there was a loss of weight, while the water with which the gold had been washed had a greenish colour. On concentrating these washings they gave a colourless neutral liquid that became green on addition of hydrochloric acid, and gave a white precipitate with caustic potash or ammonia, soluble in excess of caustic potash. These reactions not being characteristic of the metals operated upon, and the quantity of the material thus obtained being very small, Dr. Krüss sought by other means to obtain a more adequate supply of it. Eventually he found that by gently igniting a mixture of freshly precipitated oxide of nickel or cobalt with caustic potash, and treating the melted mass with water, a solution was obtained that contained from two to three per cent. of a substance which possessed the characters above mentioned, while the pure oxides of nickel or cobalt remained undissolved. On addding ammonia to this solution a voluminous precipitate of a hydrated oxide was obtained which yielded on ignition a white oxide that dissolved readily in dilute hydrochloric acid and when reduced upon charcoal gave a brown malleable metallic powder. A solution of this oxide in hydrochloric acid gives with ammonia a white voluminous precipitate ; caustic alkalies throw down hydrated oxide that is soluble in excess, and ammonium sulphide precipitates a dark brown sulphide that is readily soluble in acids. These reactions being different from those of aluminium and zinc under the same conditions, they were inferred to indicate the presence of a hitherto unobserved metal. The hydrochloric solution of this substance mixed with violet cobalt chloride gives a green colour to the solution which has probably been misleading in previous separations of nickel from cobalt. Further investigations are in progress for ascertaining the chemical relations of the newly-observed substance and its position in the series of elementary substances, as well as the correct atomic weights of nickel and cobalt.

The Chemists' Twenty-Third Annual Ball, which took place on Wednesday last in the Portman Rooms, Baker Street, proved to be a very enjoyable gathering and an undeniable success. The attendance was good, numbering upwards of 220, and the venture into a new domain was quite justified by the convenience of the accommodation and the excellence of the service. Altogether the arrangements were very creditable to the Honorary Secretary, Mr. W. H. Francis, and his coadjutors. The single toast of the evening, "Success to the Chemists' Ball and the Health of the Ladies," was proposed by Mr. W. G. Cross, of Shrewsbury, and, it is needless to say, heartily responded to.

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As the Aberdeen and North of Scotland Society of Chemists and Druggists, which is the oldest Association of the kind in the United Kingdom, will shortly complete the fiftieth year of its existence, it has been proposed to celebrate the occasion by a conversazione and supper on Wednesday, the 20th of February. Friends who would like to be present on this interesting occasion should communicate with Mr. A. Strachan, 138, Rosemount Place, Aberdeen.

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On the first day of the year the first edition of a Croatian Pharmacopœia appeared, together with a new official medicine price-list. The work appears to correspond with the recently-issued Hungarian Pharmacopœia, with the exception that it includes Aqua laurocerasi and Oleum olivarum.

* * *

It is also expected that a new edition of the Pharmacopœa Neerlandica will be issued before long, as the commission charged with its preparation has recently presented to the Minister of the Interior the manuscript ready for printing. It is stated that this third edition will contain about one hundred and fifty more articles than the second edition.

* * *

It may be useful to some of our readers to call attention to the announcement in another part of this Journal, that during the Spring Term a series of about ten Lectures on "Some of the more Important Current Problems in Chemistry," will be delivered by Professor Armstrong at the Central Institution, Exhibition Road.

* * *

The next monthly meeting of the Midland Counties Chemists' Association will be held at Mason's College on Tuesday evening, the 22nd inst., when papers will be read on "Moot Points in the Dispensing of Prescriptions," by Mr. W. Jones, and "Plant Lore," by Mr. Wilfrid Southall.

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At the meeting of the Chemists' Assistants' Association to be held on Thursday evening, January 24, a Discussion on "Trade Protection" will be opened with a paper by Mr. A. C. Stark.

* * *

The next meeting of the School of Pharmacy Students' Association will take place on Thursday, January 24, when Mr. L. Ough will give a note on "Tests for Pilocarpine," Mr. W. T. Jones one on "Euonymins," and Mr. W. Wyatt a Report on Botany.

Pharmaceutical Society of Ireland.

JANUARY EXAMINATIONS.

Passed Candidates.

Preliminary:—Messrs. Harvey, Woodside, Agnew, Walsh, Fetherston, Long and Gilbert.

License:—Messrs. Fielding, Walsh, Macartney, Roberts and O'Connor.

Five candidates were rejected.

Provincial Transactions.

MANCHESTER PHARMACEUTICAL ASSOCIATION.

A meeting of the above Association was held in the rooms of the Chemical Club, Victoria Hotel, on Wednesday evening, January 9, Mr. W. Wilkinson, Vice-President, in the chair.

The minutes of the previous meeting having been read and confirmed, a paper was read on—

Pharmacal Jottings

by H. Wilson, A.I C.,

Pharmaceutical Chemist.

Sozoiodol.—This substance was introduced by the firm of H. Tromsdorff, of Erfurt, as a substitute for iodoform, and is chemically an iodated phenyl sulphonic acid, more exactly, di-iodoparaphenylsulphonic acid. It is prepared in the following manner:—By the action of concentrated sulphuric acid on phenol one of the H atoms of the benzol ring is replaced by the group SO_3H. The body $C_6H_4\begin{cases}OH\\SO_3H\end{cases}$ being obtained, the potassium salt of this acid is prepared, dissolved in water, and treated with iodine chloride. By this means two hydrogen atoms of the benzol ring are replaced by iodine, and the potassium salt of the iodated acid separates out

$$C_6H_2\begin{cases}OH\\=I_2\\SO_3K\end{cases};$$

it is purified by repeated crystallization from water and dried. It occurs in the form of regular, well formed, colourless and odourless crystals which are slightly soluble in cold water, 1·8 parts being dissolved in 100 parts of water at 17° C. It is much more soluble in warm water and slightly soluble in glycerine and alcohol. From this body sozoiodolic acid and all the other salts are prepared. The free acid crystallizes from water in the form of needle-shaped prisms; it is freely soluble in water, alcohol and glycerine. Various salts have been prepared, the chief of those which have been investigated being those of sodium, potassium, zinc and mercury.

Sozoiodol-sodium is specially distinguished as the most readily soluble of the preparations in water, 7 to 8 per cent. Solutions in glycerine are feasible and are not affected by the action of light. The salt contains 2 molecules of water of crystallization.

Sozoiodol-potassium occurs in colourless, thick, needle-shaped prisms of perfect and constant combination. It is not easily soluble in water, but 2 per cent. solutions are employed satisfactorily. It contains 54 per cent. iodine.

Sozoiodol-ammonium crystallizes in large, glittering, beautiful, sexagonal columns of a high specific gravity without water of crystallization. It is soluble in 25 parts of water.

Sozoiodol-lead contains 18·2 per cent. lead, is sparingly soluble in cold water, but readily on the addition of acetic acid. It crystallizes in small needles that turn yellow on being exposed to light.

Sozoiodol-mercury is a fine powder of orange-yellow colour. This preparation, possessing unusually interesting properties, is a constant combination containing 31·2 per cent. mercury and 38 per cent. iodine, insoluble in cold water, but readily so on the addition of salt; as positively proved this preparation is highly antiseptic, and will probably excel all hitherto known mercury preparations in this respect.

Sozoiodol-zinc contains 6·8 per cent. zinc, is readily soluble in water, and crystallizes in colourless needles with 6 molecules of water of crystallization. Besides these compounds, salts of aluminium, magnesium, barium and silver have been prepared.

Polysolve, or Sulpholeinic Acid.—This is a so-called universal solvent, and is produced by the action of sulphuric acid on vegetable oils through a complicated chemical process, and is made neutral by repeated washings with chloride of sodium solutions and ether. When concentrated it forms a clear, light yellow, oily, viscid and neutral liquid, having a mild, subsequently bitter and sharp taste, sp. gr. 1·023; it is soluble in alcohol in all proportions, and miscible with 1 to 2 parts of water without losing its oily character. With a large quantity of water it produces a clear, or faintly opalescent foamy solution, remarkable for its extreme affinity for water and its penetrability. It may be heated for some time to 212 F. without decomposition, or may be cooled below 32 F., in which case it congeals to a light yellow mass, resembling vaseline. Polysolve is particularly distinguished for its property of combining with relatively large quantities of a great variety of substances which are either wholly soluble or form emulsions with water, such as ether, chloroform, benzin, turpentine, bisulphide of carbon, essential oil of mustard, and all ethereal oils. It is capable of dissolving by heating or boiling a large number of inorganic and organic substances, such as sulphur 2 per cent., iodoform 3 per cent., camphor 25 per cent., naphthalin, carbon, chrysophanic acid and many colouring matters. The solutions or mixtures thus produced have the property of very rapidly penetrating the pores of the skin, thus enhancing the action of the drug two-fold, first by perfectly dissolving and evenly diffusing the drug in the base, and by introducing it thoroughly through rapid and complete absorption. It is mentioned that these are positive advantages which polysolve possesses over vaseline, oleic acid, glycerine, or other vehicles for external remedies.

Morrhuic Acid.—Messrs. Arm. Gautier and L. Mourgues, in a memoir to the Academy of Sciences, announce that they have discovered a new principle, *morrhuic acid*, which is important not only by its abundance, but because it is apt to play the part of a base or an acid and easily splitting into phosphoric acid and glycerine. It may be obtained in crystals of resinous appearance, soluble in warm water and cold alcohol, but quite sparingly in ether. It turns litmus paper red, drives off carbonic acid from carbonates and combines with alkalies; yet it forms a crystallizable chloride with hydrochloric acid. Another characteristic property of morrhuic acid is that it contains nitrogen, and will form a chloroplatinate and chloroaurate much after the fashion of alkaloids. In some respects it seems to correspond to the *gaduine* found by De Jongh in cod liver oil, only he failed to look for nitrogen in the acid substance in question.

Bituminated Iodoform.—This new preparation has recently been introduced into therapy by Dr. Ehrmann, of Vienna. It is a chemical compound of iodoform and tar, and occurs in transparent scales of brown metallic colour, which can easily be pulverized. Dr. Ehrmann, after many experiments, was led to this combination by the notion that tar being an oily substance, would diminish the volatility of the iodoform, and also because tar often brings gangrenous and septic ulcers into a healthy condition. He finally succeeded

in making a preparation in which the particles of tar and iodoform are so closely mixed that only hyaline plates can be discovered under the microscope.

CAMPHORATED NAPHTHOL.—Crystallized carbolic acid liquefies when mixed with an equal weight of camphor, and this property has been made use of in obtaining a liquid which may be used as a painless cautery. M. Desesquelle states that both alpha- and beta-naphthol possess similar properties, a mixture of 10 parts of beta-naphthol, and 20 parts camphor, produces a syrupy colourless liquid which is insoluble in water but miscible in all proportion with fixed oils. In order that liquefaction be rapidly produced it is essential that the substances first be finely powdered.

A NEW SOURCE OF MORPHINE.—Dr. Bardet and pharmacist Adrian of Paris have investigated the Californian drug *Eschseholtzia Californica*, in which they found a small trace of morphine. A preliminary trial with ten grams of extract yielded traces of a substance answering to all the tests of morphine. Further experiments with one kilo of the plant showed the drug to contain, besides appreciable quantities of morphine, a larger proportion of a basic substance and probably a glucoside.

ALSTONINE (chlorogenin). This is the alkaloid of *Alstonia constricta*, an Australian apocynea. It forms white, lustrous, silky needles, easily soluble in ether, chloroform, or alcohol. It is nearly insoluble in cold water, but somewhat soluble in hot water, to which it imparts an intensely bitter taste. The bark of *Alstonia constricta* is sometimes used by ale brewers as a substitute for hops, since it is free from the effect of inducing headache or other ailments consequent on the imbibation of the hop bitter.

"DRUGS" AND "MEDICINES."—Mr. H. M. Whelpley in a letter to the *Therapeutic Gazette*, October, 1888, states that he has noticed the words "drugs" and "medicines" frequently misused in the medical and pharmaceutical journals. He cannot say whether this is the result of carelessness or ignorance, but ventures, however, to give readers the value of his superior knowledge of the subject. He says, a "*medicine*" is any substance employed in the cure or treatment of disease, and includes everything, from the food we eat to ward off starvation, to the most potent remedial agent administered. A *drug* is always a medicine, but a medicine is not always a drug. The word drug is restricted to those medicines which are in their crude commercial form; thus, rhubarb is a drug, but the tincture of rhubarb is a pharmaceutical preparation and not a drug, although both are medicines. Catechu is the aqueous extract of the wood of *Acacia catechu*, but it is a drug because it comes into the market in that form. The extract of quassia is also an aqueous extract of a wood, but it is not a drug, but a pharmaceutical preparation, as the wood enters the trade as the drug, and the pharmacist manufactures the extract from it. It is incorrect to refer to a drug as a crude drug, "for all drugs are crude," *i.e.*, the medicine in a crude form.

"POTELINE."—This is a compound for hermetically sealing bottles and similar purposes, invented by Potel. It is a mixture of gelatin, glycerin and tannin, with the addition of barium or zinc sulphates, and which may be coloured by vegetable colours. When cold, it may be turned, filed, bored, polished, and can be used for numerous purposes by varying the proportions. For sealing bottles it must be applied liquid.

AMYGDALIN AND EMULSIN IN BITTER ALMONDS.—Amygdalin is a glucoside and emulsin a ferment in bitter almonds, peach kernels and some other seeds. When seeds containing these substances are bruised and macerated in water, the ferment causes the decomposition of the glucoside with the production of glucose, hydrocyanic acid, and the volatile oil of bitter almonds. The question has been raised, Why do not these changes take place except when the seeds are crushed or ground and macerated in water? M. Johanssen has investigated the matter, and has reached the conclusion that in the case of bitter almonds at least, it is because the two principles are differently distributed in the seed. Amygdalin is localized in the parenchyma of the cotyledons, and is not found elsewhere in the seed, while emulsin occurs only in the fibrovascular bundles of the cotyledons, and in axile parts of the embryo.

BATJITJOR ROOT.—Under the name of batiator or batjitjor a root is sold in different parts of Senegambia, which is supposed to have febrifuge, emetic, anti-hæmorrhagic, and antidysenteric properties. It has been described as a substitute for ipecacuanha and is alluded to as such by Dorvault. It has recently been definitely recognized as the root of the *Vernonia nigritiana*, a composite plant growing to the height of a foot or two, and bears a faint external resemblance to ipecacuanha, which, when fresh, it is said to resemble in smell. Heckel and Schlagdenhauffen find in this root no trace of any true alkaloid, but they have obtained from it a whitish, slightly hygroscopic glucoside, having the formula $C_{10}H_{24}O_7$, which they have called "vernonin," the action of which on the heart resembles that of digitalis. They, however, consider that it is twenty-four times weaker than the soluble principle of digitalis (digitalein).

ERYTHRIN.—Dr. Fernando Altamirano has communicated to the Academy of Medicine of Mexico some researches he has made upon an alkaloid obtained from the Mexican plant *Erythrina coralloides*, or colorin, as it is there called. The principle with which he has been experimenting, and which he calls "erythrine," is a white, spongy, greasy solid, crystallizing in various forms, melting at a low temperature, a dark yellow liquid with a disagreeable and characteristic odour being formed. It is soluble in water, ether, and in benzol, still more so in chloroform, and very freely in alcohol. From the solution in this last only can it be crystallized. From its alcohol solution it is precipitated by alkalies, especially by ammonia, as an amorphous substance resembling resin. Concentrated nitric acid dissolves it, colouring it slightly yellow. It is precipitated by bichloride of mercury, by double iodide of bismuth and potassium, by bichloride of platinum and by bichromate of potash. It contains nitrogen. Dr. Altamirano has been able to show that erythrine has great power in counteracting strychnine poisoning, and he has also proved to his satisfaction that doses of 0·6 gram can be borne without danger by the human subject.

"NITRITE OF COBALT."—This has recently been introduced into medicine as a definite agent for administering nitrous acid. It is the double nitrite of cobalt and potassium, which was originally discovered by Fischer. It is obtained as a yellow precipitate when the solution of a cobaltous salt acidified with acetic acid is mixed with a solution of nitrite of potassium. The reaction may also be used as a test for cobalt, as follows. The solution containing a cobalt salt is evaporated to a small bulk, then caustic soda added, and the precipitate redissolved with an excess of acetic acid. A solution of potassium nitrite is added, the whole digested for a while at a gentle heat, and then set aside for twenty-four hours, when the yellow precipitate of the above mentioned double salt will separate. It is best washed with a solution of potassium acetate containing a slight excess of acetic acid; and, lastly, with 80 per cent. alcohol. It possesses the advantages of being easily prepared, cheap, stable, and safe, and, according to report, compares favourably in its effects with the other nitrites.

A discussion followed, in which the following took part:—the Chairman, Messrs. G. S. Woolley, Benger, Smith, Kemp, Husband, and Arrandale.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

At a meeting of the above Society on Wednesday, the 16th inst., the following paper was read:—

Some Suggestions to the Retail Pharmacist of To-day.

BY G. A. GRIERSON.

Anyone who mixes in the society of pharmacists, especially retail pharmacists of the present day, cannot help noticing in their conversation a general tendency to pessimism when trade matters are referred to. The old men speak in glowing terms of the ease with which money could be made when they commenced business, and deplore the radicalism which has led to such a disordered state of things. The young men unite in wishing that they had lived in that golden age, so much dilated on by their seniors, but here their unanimity of opinion ceases; one section of them proceeds to make the best it can out of the iron age into which it has had the fortune to be born, the other laments the misfortune of its birth, stands upon its dignity in its relations to the public, and calls upon Jupiter to come down and help it. But Jupiter is also under the influence of the spirit of the age, and either cannot help them, or else sends them a log which satisfies their cravings for a time, but as soon as its insufficiency becomes apparent, only gives rise to fresh grumbling.

It cannot be gainsaid that the Pharmacy Act fails to give to qualified chemists and druggists the monopoly which they think they have a right to expect. There can also be little doubt that legislation of a more restrictive character is at the present or any future time impossible, so strong is the influence of free trade canons. Help not being forthcoming from without, then in what direction must the struggling pharmacist look for salvation?

The only practical answer to this question is to be found in the pharmacist himself; he must discard once and for all the staff of state protection, must draw upon the resources with which experience has furnished him, must convert all the science he ever learnt into art, and must elaborate that art with a fund of skill which can only be born of patient work, strict attention to detail, and accurate observation. In this way only will come that mature discretion, in the absence of which even genius finds itself baffled in the race for success.

In what is known as the wholesale drug trade the elements just mentioned have full sway. Only by strict attention to detail and patient work can the manufacturing chemist hope to perfect his manufactures, without which perfection he knows he cannot command for them a sale. Ask any pharmacist who has begun at the beginning and worked up a large trade in a special article how he did it. He will tell you a story of alternate hope and despair, of small matters of detail leading to great annoyance; of times when to speak of patience seemed a mockery, when all his science and ingenuity came to nought; of a long and winding path which at times appeared to lead nowhere, but whose tendency was always upward, although not always perceptibly so, and which like the winding mountain track ultimately came out at the top, where the whole atmosphere was clearer, and where the enjoyment was rendered all the more keen by the remembrance of the struggles and disappointments through which it was reached. But even when this stage is attained it becomes necessary that the manufacturer should choose the channels through which to introduce his preparation, and the most acute observers will not only be the most successful in finding markets for their manufactures, but they will also be the first to find out the wants of any given market, and if they are possessed of a ripe judgment will be the first to supply those wants. So long as a manufacturer holds a monopoly in any article, provided there is a demand for that article, he can fix his own price; but increased demand always leads to increased sources of supply, and when competitors offer the same article at a reduced price the monopolist must either drop his price or lose his trade. If, however, his article has some inherent qualities which render it superior to that offered by his competitors he finds no difficulty in maintaining his sale even if his price be higher than theirs; he therefore keeps up the price of that article while selling all ordinary commodities which he has no reason for supposing better than other people's for what they will fetch. If in selling them at this price he finds he is losing on them, either he is not buying his materials in the cheapest market or his neighbour is also losing on them. In the former case the remedy is evident, and in the latter things will soon right themselves, for his neighbour must either raise his price or go to the wall.

If these, then, are the conditions under which the wholesale and manufacturing sections of the drug trade—in common with other traders—have managed to flourish, they surely cannot be unhealthy.

Something like ten years since there were many retail pharmacists in this country, the bulk of whose income was derived from the sale of patent medicines and proprietary articles not made by themselves. About that time, however, grocers, drapers, and general dealers began to see that there was something in the trade, not only because it carried with it a fair profit attached to a minimum of labour, but also because certain of the articles, being largely advertised, would attract customers, who, being notoriously conservative in their shopping habits, would probably get into the way of buying their other goods where they could get their patents cheap. Pharmacists at this time laughed to scorn the idea of their trading brethren being able to beat them on the ground they had been masters of so long; they went on selling at the old prices. Their sales at first gradually, but afterwards more quickly, decreased, until ultimately they awoke to the fact that their trade was fast leaving them, and that the public respect for the profession could not be worked up to paying 1*s.* 1½*d.* to it for an article which could be obtained from the grocers for 10½*d.* In some towns, when this stage had been reached, the men whose preserves had been so rudely and yet so successfully invaded put their heads together and resolved to "drop prices." Too late, however! the public had found themselves well served by their new caterers; the stores had had time to get their new trade thoroughly organised, could buy in such quantity as to obtain extra discount, and could therefore give their customers the benefit, so effectually preventing their return to their old providers.

But the evil did not stop here. The stores, inebriated with the success of their first effort, and encouraged by the unbusinesslike qualities shown by their pharmaceutical competitors, thought they might safely launch some capital in the general drug line. So things have progressed until we now have, with the exception of a few poisons, a promiscuous trade in drugs and things pharmaceutical, from "headache pills" and "colic drops" to saccharin and cocaine. It may seem uncharitable to make a noise over what cannot be undone, but I think there is no resisting the conclusion that had pharmacists been alive to their interests when grocers first took up patents, they would at once have dropped their prices, prevented their would-be opponents from gaining a footing, and so kept out the thin end of a wedge which now bids fair to rend in pieces the whole retail drug trade.

That none but the capitalist can afford to sell at a gross profit of 10 per cent. is certain. For this reason many pharmacists have entirely given up the patent medicine trade, while others retain the old prices, not caring whether they lose or keep their customers.

Now, in the light of the last ten years, this must appear to all who have given the subject a thought a very shortsighted policy, and one which in its results can prove nothing but disastrous. Letting your customers go elsewhere for the articles they see puffed in the public prints, and which, therefore, they must have—if only to try—is exposing them to temptation which may, and will, result in the crippling of what you consider the more legitimate part of your business. It is well known that several leading pharmacists have "condescended" to compete with their store opponents in the matter of prices. Curious to know what their experience has been, and thinking that it might be a guide for some of the future actions of their more timid brethren, I wrote to two leading firms, asking to be favoured with an opinion based on experience. One well-known firm writes as follows: "Unusually powerful competition induced us to lower our charges to cash buyers, and after two and a half years' experience we feel completely satisfied with the result, both from the commercial point of view and that of personal comfort in conducting business. On cash sales of patents we aim at 10 per cent. profit. On dispensing there is a reduction of 20 to 25 per cent. for cash. Credit customers pay full prices, but are allowed a discount on monthly accounts." Another writes: "I am satisfied of one thing—that if chemists are to hold their own they must take a broader view of trade principles, and not allow themselves to be beaten. They must supply what is asked for, and at prices which compare with their neighbours'. One cannot fail to be amused at some of the letters appearing on the 'cutting question.' One would think some chemists imagined they are indispensable, and can reasonably expect the people to pay them 30 per cent. more than the grocer or take anything they choose to recommend. With some it will do very well, but on the whole, he who does the trade best will secure most customers." I have devoted all this attention to patent medicines because they are typical of what has occurred and what will constantly recur in the case of commodities in which there is free trade, and for the sale of which nothing is required but business tact.

At the present time the pharmacist's stronghold lies amid what may be called pharmaceutical products. His education and his special training combine to make him the right man to sell drugs, which are always liable to variation, and on whose potency may depend a life; or, preparations, whose activity may convert a life of misery and suffering into one of happiness and content. But if he would keep this, the more legitimate and certainly the more noble branch of his calling, in his own hands, he must be consistent in his conduct of it. He must be able to guarantee the genuineness of every article he sells, not only from having examined it when put into stock, or made it to the best of his lights, but also from having watched carefully that it did not deteriorate by keeping. I have known cases in which a pharmacist utterly failed to perform such a simple operation as poison a dog, for no other reason than that his prussic acid had been kept too long. It is well known that prussic acid has an almost specific action on certain forms of acute dyspepsia; now what would be the effect of such an acid when used in such a case? Probably, the patient finding no relief from it, the physician would discard it as valueless, and in his practice at least a powerful means of relieving suffering would be utterly lost. The value of knowing exactly the composition and strength of what we dispense is shown in a remarkable manner in the recent work on nitrites so splendidly carried through by the workers in the research laboratory of the Pharmaceutical Society in conjunction with several eminent therapeutists. There is no denying the value of such work, and pharmacists need not be deterred by its elaborate nature from doing something in the same direction. In the case of most ordinary drugs there are already cut and dried processes for ascertaining their strength, and practice makes the proper conduct of them a purely mechanical operation; but every true pharmacist can think of some subject of which he knows more than his fellows and for the more thorough investigation of which he can easily acquire, if he does not already possess, the ability.

I do not hold for one moment that the man who has devoted considerable time and energy to the investigation of a subject which may have resulted, say, in the perfecting of a pharmaceutical preparation, is bound to scatter broadcast the knowledge so obtained; our present study is the scientific man of business, not the scientist. If a scientist is supported by some institution or corporation, for the purpose of adding to the general knowledge, it becomes his duty when he makes a discovery to give his employers and through them the world the benefit of his discovery. In the case of the man of business there exists no such compulsion; if he makes some discovery which he sees is likely to improve his business position, he has quite a right to keep that discovery to himself. There is a tendency in certain quarters to decry the application of scientific investigation to the furtherance of individual interests; such a cry is opposed to both logic and common sense. If a man employs himself or any other individual to investigate any special subject he has the same right to the result of that investigation that a corporation, or institution, or the world, have to the discoveries of the individuals they employ. And this, I think, is the direction in which the pharmacist of to-day should never cease to work. By perfecting himself in the making and testing of routine preparations, by applying his science and training in the investigation of new fields, by using the results of his investigation in improving his business position, and by employing strictly business canons in finding markets and fixing prices for his goods, he will find that he can not only hold his own against his less skilfully armed competitors but can actually see his way to a fair share of the world's luxuries.

It may be that there are pharmacists who from various causes find that they cannot make purely pharmaceutical investigation pay. Undoubtedly it very often is so, and where the pharmacist finds that it is, the next best thing to do is to find out the wants of the district in which he is placed, select those he feels himself most competent to supply, and supply them well. The first thing to do in building up a trade is to conduct it with such energy and skill as to command the respect of those for whom you cater. All labour is honourable, and whether it take the form of relieving human suffering, of trading in chemical and photographic apparatus, of selling oil and paints, or of putting up telephones, it is nothing for which a man need sacrifice his self-respect, so long as he does it well.

To sum up, the pharmacist of the present, if he would retain his individuality in the future, must discard all state props, and trust more in himself. He must sell all articles, the sale of which requires no special qualification, at prices which they will fetch. He must perfect his scientific and technical training, so that he may consistently call himself a pharmacist with the certainty of commanding respect and hence success. And if he combine with these the business tact and knowledge which can see and find means to supply the wants of a district, he will never have any reason to regret the fact that the economists, who are at the head of British politics, decline to recognize his greater right to protection than his fellow traders.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

Note on an Improved Form of Pessary Mould.*

BY A. WYBRANT.

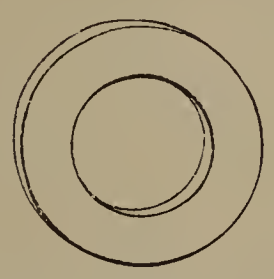
The pessary as made by pharmacists at present retains the form of that originally introduced, and is a somewhat imperfect and clumsy vehicle.

Many of you perhaps have not had the opportunity of actually administering it, but if you ask any surgeon of your acquaintance he will tell you how it slips about in contact with the warm hand, does not carry straight, and generally requires much manual skill to introduce effectively, and so demands a certain amount of freedom with the hands which is not always convenient.

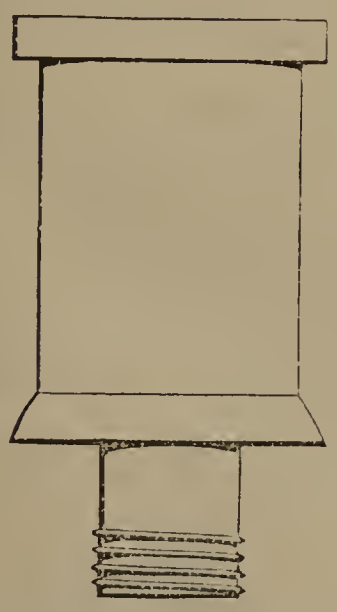
This is to a great extent remedied in pessaries made as I propose.

1. Shows cone, producing the hollow in pessary.

2. Cylinder with mould inside, fits over No. 1.



3. Collar, goes on No. 1, to facilitate removal.



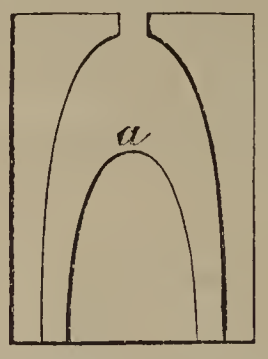
4. Box to hold all the above.

5. Wire pin to let out air from inner cone.

In the mould before you we have a long piece of metal with a cone-shaped head, as seen in Fig. 1, surrounded at the base by a collar. This cone-shaped prominence produces the hollow in the pessary, and it is this hollowness which is claimed as the improvement.

Fitting over the end of Fig. 1, resting on its collar, is another and moveable one, Fig. 3. This was found necessary, as without it much difficulty was experienced in removing the finished pessary.

Next in order we have the cylinder Fig. 2, shaped inside like the hole in an ordinary mould. This fits over Fig. 1, leaving a space to be filled up by the pessary. To keep these parts together the box, Fig. 4, was adopted.



6. Vertical section, showing pessary *a* in position in mould.

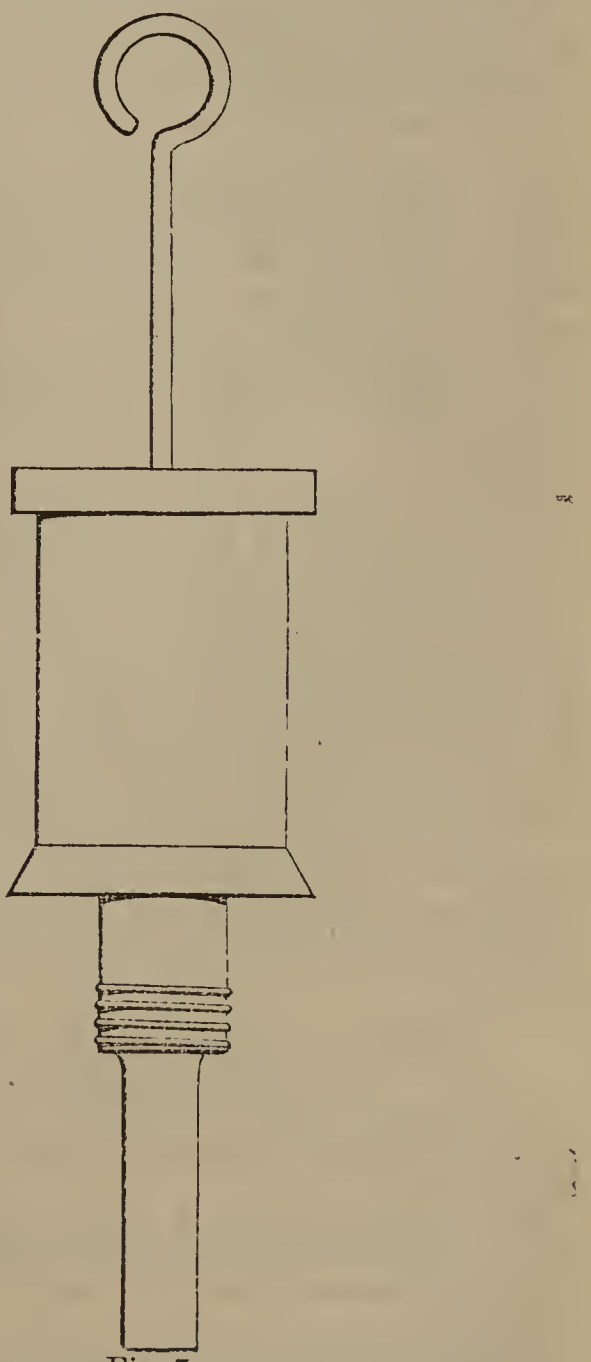


Fig. 7.

Now came the difficulty; how was the melted base to be got in? It could not be done from the bottom or sides, and so only the top remained. The hole for this purpose is shown in Fig. 6. This figure also shows well the pessary "A" in its position in the mould, surrounded by the cylinder, Fig. 2, and the metal cone, Fig. 1, at the base.

The wire pin, Fig. 5, goes in through the opening seen at the top of Fig. 6, and reaches to the cone head. It serves as a vent peg for the confined air.

* Read at a meeting of the Chemists' Assistants' Association, Thursday, November 22, 1888.

Fig. 7 shows the whole parts put together and ready for use.

The melted gelatine or fat, containing the required medicament, is poured in through the opening where the vent peg passes out, and when cold, the parts may be removed, and the pessary will be found adhering to cone, Fig. 1, and can easily be removed by pulling off the collar, Fig. 3.

The long tail to Fig. 1 is quite unnecessary. Although this mould only makes one at a time, once it is made to answer it would be easy to cast for six, twelve, or any number of pessaries.

Again it is often the desire of the physician or surgeon to administer nutriment or remedial agents *en masse* per vagina, sometimes even in a liquid form, and I know that I for one have been often sorely tried as to how this could be done.

Of course, I know some firms make a speciality of hollow pessaries, but I think if we could conveniently do them ourselves, it would be better.

With the mould before you, the pessaries are made hollow, sufficiently to admit the end of the forefinger, which is alone necessary for their adminstration.

In midwifery, especially, this is a great boon, and one that has already been appreciated by those gentlemen to whom they have been introduced.

They can be filled with solids, powders, or liquids, and sealed with thin discs cut from solid pessaries.

The mould is not by any means perfect, and I shall be glad of any suggestions as to its improvement.

The President congratulated Mr. Wybrant on the ingenious form of mould he had exhibited. He certainly thought it an improvement on the present shape, but was inclined to doubt that liquids could be administered in such a vehicle.

Mr. Richards said that there were two pessary moulds which produced a pessary much resembling this, already in the market, one of which he knew was patented.

Mr. F. A. Rogers asked Mr. Wybrant whether he did not think it would be an improvement if the opening in the pessary was made at the other end.

Mr. Wybrant, in reply, stated that liquids could be safely administered in this pessary if a disc of cocoa butter was affixed to each end. His original idea was that the end of the pessary should be rounded, but he had found it difficult to get a suitable mould made. He was not aware that the idea had been patented, but as a matter of fact a patent had been applied for, for this form, prior to the time mentioned by Mr. Richards. He considered that this form of mould might be a useful acquisition to the pharmacist. He might mention that the pessary could be easily made in gelatine.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of the above Association was held on Thursday, January 10, Mr. F. Browne, Vice-President, in the chair.

Mr. C. B. Bell read a paper on "Sir Humphrey Davy," which contained a complete sketch of his life, and an outline of his work and his principal discoveries.

The paper gave rise to a discussion, in which the Chairman, Messrs. Dymond, Salter, Marsden and the Secretary took part.

The chair was then taken by Mr. J. G. Sturton, while Mr. Browne delivered the following—

Report on Analytical Chemistry.

BY FRANK BROWNE.

Black Waters of Equatorial Regions*.—It may not perhaps be known to all, that in Brazil are rivers, tributaries of the Amazon and Orinoco, which travellers are accustomed to call "black." Flowing through scenes of tropical splendour, they appear out of harmony with their surroundings; for every ripple, cascade and waterfall has the same sombre hue.

Concerning them, A. de Humboldt says:—"Seen in thick layers these waters appear brown like coffee or of a greenish-black; in the shade they are black like coffee grounds. In a glass they present a yellowish-brown colour of greater or less intensity. In spite of this coloration they are very clear. They are the finest of waters and most agreeable to the taste. They are drunk in preference to others. The rocks on their banks are white, while those on the banks of rivers of white water are black. These blacl streams do not communicate their colour to the v hite when they intermingle."

From a recent exploration of the upper parts of the Orinoco, these statements of Humboldt have been fully confirmed. An analysis of the water has been made, and from it the explanation of these peculiar properties has been deduced. The parts through which these rivers flow are of granite formation.

The sample was analysed after having been taken from its source two months before. It had preserved its colour and clearness; the smell was also fresh and agreeable. It contained in 1 litre ·028 gram of organic matter, consisting almost entirely of brown acids of indefinite composition, such as are produced from peat-moss. The water contained no chalk—less than ·001 gram per litre. Nitrates were totally absent. Very little mineral matter was present; only about ·016 gram per litre, consisting of silica, oxides of iron, manganese, aluminium and of potassium with traces of ammonia.

The explanation given by the investigators, Messrs. Muntz and V. Marcano, is as follows:—No lime being present, the vegetable acids are free, consequently nitrification resulting in the oxidation of the organic colouring matter cannot take place, as the total absence of nitrates proves. Again, the black do not colour the white waters, because these latter contain lime, which saturates the vegetable acids, and thus nitrification now rapidly proceeds. It was said also that the rocks on the banks of the black waters were white. This they ascribed to the presence of the vegetable acids, which prevent the deposition of oxides of iron and manganese.

The coloration being due to the chemical composition of the acids, they say that the intensity of it is due to various phenomena of reflection taking place in the lower layers of the water.

Test for Antimony.*—It has recently been shown that the presence of antimony, alone, or in a mixture of salts, may very easily be indicated by means of a simple test applied in the dry way on charcoal.

When a salt of antimony is heated alone or with fusion mixture, a white sublimate of antimonious oxide is left upon the charcoal. If, now, a drop of AmHS be placed upon this sublimate a reddish or orange coloration is invariably produced, due to the formation of orange sulphide of antimony.

As no other metal answers the same test, which is very trustworthy, even in a mixture of salts, it would sometimes save much time to perform it before proceeding in the wet way.

Standardization of Iodine Solution.—In a recent communication from the Research Laboratory, it was shown that tartar emetic might be easily estimated by means of a volumetric solution of iodine; similarly, it need scarcely be said, the converse is true also.

All who have restandardized iodine solution with arsenic know that although the method is easy, much time is taken up in dissolving the arsenic. This draw-

* *Comptes Rendus*, note from Messrs. Muntz and Marcano, Dec. 3, 1888.

* *Chemical News*, December 21, 1888.

back is obviated by using anhydrous tartar emetic. This anhydrous salt is prepared by precipitating a strong aqueous solution of tartar emetic with methylated spirit, washing the decanted precipitate with more spirit, and quickly drying over a water-bath. So prepared it has been shown to be a very pure and stable salt, dissolving almost immediately when put into water. Sodium bicarbonate must be present in this aqueous solution, and the estimation conducted at once, when very excellent results will be obtained.

ARTIFICIAL COLOURING OF CONFECTIONERY.*—It would be expected that innocuous colouring matters, as saffron and turmeric, would be the most used; but from the analyses of Mr. F. Coreil, this does not seem to be the case. In France, he found that the following substances were more often used. Mentioned in the order of the frequency of their occurrence they are:—

The sodium salt of dinitronaphthol or martius yellow, the sodium salt of dinitronaphthol sulphonic acid, saffron, turmeric, annatto and picric acid.

The method recommended for detecting these is as follows:—Macerate 50 grams of the coloured body with about 100 grams of 90 per cent. alcohol for one or two days. Evaporate this alcoholic tincture, having previously placed in it some pieces of wool, over a water-bath. Evaporate also a portion to dryness.

Upon the dried coloured wool is poured some strong sulphuric acid.

A. A change of colour is produced; presence either of saffron, annatto, or orange coal tar colours.

(*a.*) Saffron. The colour produced by the sulphuric acid is blue, fugacious, passing rapidly from violet to brown. The residue obtained by evaporation is not very soluble in ether, but soluble in alcohol, water, and in alkalies which do not darken its colour. The aromatic odour of saffron can also be detected in the tincture.

(*b.*) Annatto. The colour produced upon the wool is a magnificent indigo-blue, and is permanent. Alkalies dissolve the residue from the alcoholic tincture with formation of a fine dark red colour; on the addition of acids to this alkaline solution the colouring matter is precipitated in the form of flocks.

(*c.*) Orange or tropœolin. This dye was not found in anything that was examined. The wool with sulphuric acid may be of a red, violet, or yellowish-brown colour, but the best test is to add an acid to the alcoholic solution, when a yellow colour is produced; or with an alkali the solution acquires a rose tint.

B. No change of colour.

Presence of either turmeric, picric acid, and the greater number of the yellow coal-tar colours.

(*a.*) Turmeric. Add an alkali, a reddish-brown colouration is produced. The residue from the alcoholic solution is only slightly soluble in water.

(*b.*) Picric acid. The alcoholic solution is very bitter. The coloured wool treated with sulphydrate of ammonium becomes red. To the residue from the evaporation of the alcoholic tincture is added some ammonia, and the solution so formed is evaporated to dryness; on this residue is placed some cyanide of potassium; a fine red colour results.

(*c.*) The sodium salt of dinitronaphthol. The residue from the evaporation of the alcoholic tincture does not dissolve very well in cold water, but solution is effected by means of heat. Hydrate of potassium produces no precipitate. Hydrochloric acid gives a whitish precipitate.

(*d.*) The sodium salt of dinitronaphthol-sulphonic acid. The residue from the evaporation of the alcoholic tincture is only slightly soluble in cold but dissolves readily in boiling water. Hydrate of potassium when added to the alcoholic solution gives no precipitate. The aqueous solution is unaffected by hydrochloric acid; sulphuric acid gives a brownish-yellow precipitate. These tests have not been brought under notice with a view to their use for the analysis of the colouring matter of confectionery, but rather as a help for the detection of the dyes used to prepare the adulterants of various materia medica substances.

* *Journal de Pharmacie et de Chimie*, Nov. 1.

A NEW ALKALI PROCESS.*—From time to time patents have been taken out for the manufacture of hydrate of sodium from sulphate by means of slaked lime. Staveley, believing that the non-success of the processes was due to reverse chemical change, proceeded to find a compound which would unite with the hydrate of sodium at the moment of formation. Such a one he found in cresol, which caused almost a complete decomposition into sodium cresolate with precipitation of calcium sulphate. As sodium cresolate can be decomposed into cresol and sodium carbonate by means of carbon dioxide, the process was patented.

The following is the manner in which these analytical reactions are made use of for the manufacture of alkali:—

Freshly-burnt lime is slaked and converted into milk of lime. To this solution is added a quantity of crude phenoloids, the boiling points of which are preferably from 190° to 250°. The solution of calcium phenolates thus formed is added to a hot solution of sodium sulphate, the contents of the vessel being briskly agitated. From experiments, 96 per cent. of the sodium sulphate is decomposed. The contents of the vessel having been allowed to stand, the calcium sulphate sinks to the bottom, whilst the sodium phenolates are in solution. The greater part of the supernatant liquid is decanted, the residue filtered; the calcium sulphate on the filter is washed with hot water, the washings being retained for the solution of the sodium sulphate of the next operation.

The sodium phenolates solution is now treated with limekiln gases till fully carbonated. After standing the liberated phenoloids separate as an oily liquid from the layer beneath of sodium carbonate; they are run off and can be used again for subsequent experiments. The sodium carbonate solution, containing a little of the phenoloids, is evaporated sufficiently for crystallization to take place. The crystals are calcined in the usual manner, by which the phenoloids are volatilized and lost. In order to avoid this loss a small quantity of solution of hydrate of sodium is added to the sodium carbonate in the evaporating pan. Thus phenolates of sodium being formed are retained in the mother liquor after the sodium carbonate has crystallized out.

This same process may be used for the manufacture of potassium carbonate from sulphate.

This process compared with the "Leblanc" shows that the expense is a little more.

In the "Leblanc" for every ton of soda ash are required,

2 tons of coal at 4*s.* 6*d.*	= 9*s.* 0*d.*
Limestone	= 4*s.* 6*d.*
	13*s.* 6*d.*

In "Staveley's" for an equal weight of soda-ash are required,

11 cwts. of lime	= 6*s.* 0*d.*
20 gals. phenoloids at 5*d.* . . .	= 8*s.* 4*d.*
	14*s.* 4*d.*

The loss of phenoloids is put at 20 gals. for every ton of soda ash manufactured; but the inventor of the "phenol soda" process believes it might be reduced to 10 gals.; the exact loss has not been determined by experiment.

This process is said by the inventor "to approach nearer to success than any other for making soda from salt cake, apart from the 'Leblanc.'"

This alkali process cannot very well be left without

* *Journal of the Society of Chemical Industry*, Dec. 31, 1888.

considering what its successful application would be to the producer of coal-tar oils. Every new development of the electric light increases the scare of the gas companies; but these would be more able to compete successfully with the electric light companies, should a demand for the oils spring up. It would cause a lowering in the price of gas, also in that of the electric light, which will probably never take the place of gas until the cost of the two lights is identical.

ESTIMATION OF LITHIUM IN MINERAL SPRINGS.*—From 1 to 10 litres of the water is taken and evaporated, in order to remove earthy carbonates and other salts. After this concentration, there is in solution only chlorides of the alkali metals, together with a small quantity of chloride of magnesium. This solution slightly acidified is gently evaporated, stirring constantly in order to obtain small crystals. The evaporation is stopped before dryness is reached, and some 90 per cent. alcohol is added. The solution is now allowed to stand for several hours, after which it is filtered from the chlorides of sodium and of potassium, the greater amount of which salts has crystallized out. The filtrate is distilled, and the residue is dissolved in a little water and two or three drops of hydrochloric acid, and again evaporated. When not quite at dryness absolute alcohol is added. The solution is filtered and the contents of the filter are washed first with alcohol, then with a mixture of alcohol and ether. The filtrate is distilled; the residue is nearly pure lithium chloride. This is dissolved in 20 to 50 c.c. of water, an equal volume of ammonia is added, also a little fluoride of ammonium dissolved in ammonia. After standing several hours, the precipitate of lithium fluoride is collected upon a small filter and washed with a little hydrochloric and hydrofluoric acid. The volume of the filtrate and washings must be noted as ·001 of lithium fluoride, is dissolved in 3·5 c.c. The precipitate is now heated gently to drive off ammonia and excess of ammonium fluoride, then weighed. It is then converted into lithium sulphate, which is also weighed. This weight should be a little more than double that of the lithium fluoride, provided no other metal is present.

$$\frac{Li_2SO_4}{(LiF)_2} = \frac{110}{52} = \frac{2\cdot115.}{1}$$

It is seen by calculation that the other alkali metals give very different proportions.

$$\frac{Na_2SO_4}{(NaF)_2} = \frac{142}{84} = \frac{1\cdot69.}{1}$$

$$\frac{K_2SO_4}{(KF)_2} = \frac{174}{116} = \frac{1\cdot5.}{1}$$

If the weights of lithium fluoride and sulphate do not bear this proportion, the sulphate must be redissolved and again converted into fluoride. If the error is believed to be due to magnesium sulphate, the mixture of lithium and magnesium sulphates should be dissolved in water, and amount of magnesium sulphate estimated by conversion into pyrophosphate.

The Report was followed by a discussion, in which the Chairman, Messrs. Dymond, Woodruff, Salter and the Secretary joined.

After some remarks by Mr. Burridge on the effect of camphor in lowering the congealing point of olive oil in linimentum camphoræ, the meeting adjourned.

Obituary.

SIR WILLIAM O'SHAUGHNESSY BROOKE, M.D., F.R.S.

The death at Southsea is announced, after a very short illness, of Sir William O'Shaughnessy Brooke, late Director-General of Telegraphs in India, in the 80th year of his age. William O'Shaughnessy was born at Limerick in 1809, and having graduated in the University of Edinburgh, entered the medical service of the East India Company in 1833, and subsequently did good service in the investigation of the Indian materia medica. In 1856 he was knighted for his services in connection with the Indian telegraph service and in 1861 assumed the name of Brooke by royal licence. Sir William was a member of the Committee appointed to draw up the Pharmacopœia of India, and in 1856 he was elected an Honorary Member of the Pharmaceutical Society of Great Britain.

* *Journal de Pharmacie et de Chimie*, Nov. 1.

Notice has also been received of the death of the following:—

On the 12th of December, Mr. Robert Perry, Chemist and Druggist, High Street, Gravesend. Aged 66 years. Mr. Perry had been a Member of the Pharmaceutical Society since 1872.

On the 31st of December, Mr. Arthur Bolas, Chemist and Druggist, Icknield Street East, Birmingham. Aged 53 years.

On the 6th of January, Mr. Arthur Cooper, Chemist and Druggist, Market Place, Ashby-de-la-Zouch. Aged 41 years. Mr. Cooper had been a Member of the Pharmaceutical Society since 1870.

On the 7th of January, Mr. Joseph Coupland, Pharmaceutical Chemist, Regent Parade, Harrogate. Aged 61 years. Mr. Coupland had been a Member of the Pharmaceutical Society since 1853.

On the 11th of January, Mr. Robert Banks, Chemist and Druggist, Hull. Aged 44 years.

On the 11th January, Mr. Edward Stanbury Madeley, Chemist and Druggist, West Kensington Terrace, London, W. Aged 33 years. Mr. Madeley was an Associate in Business of the Pharmaceutical Society.

On the 11th of January, suddenly, Mr. Josiah Messer, Chemist and Druggist, Oxford Street, London. Aged 67 years. Mr. Messer was formerly a Member of the Pharmaceutical Society.

Review.

ATLAS OF CHEMISTRY (Inorganic and Organic), designed for the use of Medical and Science Students, and Science Teachers in Schools and Evening Classes. Part I. By VICTOR V. BRANFORD, M.A.*

The author is of opinion that the great difficulty in acquiring a science is to know what to forget, and has accordingly drawn up these diagrams so as to present to the student in a pictorial manner an outline of the things he must not forget. The present instalment consists of ten tabular schemes, and more are to follow to complete the series. The subjects dealt with so far include inorganic substances, elements, oxides, bases, acids, salts, chemical reactions, symbolic formulæ, solubilities (in water), and a scheme for studying each element. Taking as an example Table No. 7, "Chemical Reactions," we find two main divisions, viz., kinds and laws. These are then subdivided; under kinds we have direct combination, decomposition, double decomposition, substitution, reduction, and rearrangement, with examples in each case; while under laws we have a brief outline of those of Berthollet.

The other tables are similar in their arrangement, and are not intended in any way to replace the ordinary text-books, but simply to present to the mind in a graphic manner, and call more particular attention to, the general principles and laws of the science, for which purpose they seem very well adapted.

* Edinburgh: E. and S. Livingstone. Long 8vo., pp. 1-23. 6*d*.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Dymock and Hooper, Millard, Krause, Evans, Francis, Wilson, Rice, Sutherland.

PODOPHYLLUM EMODI.

BY BRIGADE-SURGEON W. DYMOCK AND D. HOOPER.

The genus *Podophyllum* contains only two species, one Himalayan and the other American. The Indian species (*P. Emodi*, Wallich) inhabits shady valleys in the inner ranges of the Himalaya, and is very abundant in Kunawin and Cashmere. The remarkable appearance of its bright red fruit would lead one to suppose that it must have attracted the attention of the Hindus, and judging by the Hindi names "papra" and "bhavan bakra," it is probable that it was one of the bile-expelling plants described by Sanskrit writers under the names of "parpata" and its synonym "vakra." In Hindi the Sanskrit "parpata" becomes "pápra" and "vakra" changes into "bakra," the prefix "bhavan" probably means "hill," and the Hindi name would thus signify "hill vakra," as distinguished from "kshetra-vakra" or "kshetra-parpata," *i.e.*, field vakra or parpata, a name applied to one or more species of *Oldenlandia*. The modern medical literature of India contains hardly any information about this plant. A specimen of the root was forwarded to the Committee for investigating Bengal drugs by Dr. Falconer about fifty years ago, but no examination of it appears to have been made. The plant is mentioned in the Pharmacopœia of India as a possible source of podophyllin, and Stewart says that the fruit is used medicinally in Lahoul.

Description.—Stem or scape 6 to 12 inches, erect, stout, herbaceous; leaves 2, vernal, alternate, long-petioled, plaited and deflexed in vernation, 6 to 10 inches in diameter, orbicular, 3 to 5 lobed to the middle or base: lobes cuneate, acutely serrate; peduncle terminal in bud, then apparently supra-axillary or inserted on the petiole of the upper leaf; flowers 1 to 1½ inch in diameter; sepals very deciduous; petals 6, sometimes 4 (Royle), obovate-oblong; berry 1 to 2 inches long, red ('Flora of British India'). The root agrees in most particulars with that of *P. peltatum*, but differs in the intervals of the knots whence the aerial stems are given off, the knots being more frequent in this species. The rhizome is cylindrical or depressed, crowded above with tuberosities marked by oval or circular scars, and giving off numerous long simple rootlets below. The terminal bud is enclosed in whitish papery sheaths. The colour is yellowish-brown, paler in the rootlets. The fracture is short and horny or mealy, disclosing a white section with an irregularly circular arrangement of vascular bundles, and bounded on the outside by a thin brown cortical layer.

Chemical Composition.—The resin of the Podophyllum of the Pharmacopœias being the chief constituent, the drug under discussion was examined with a view to ascertain the amount and properties of any allied principle. A weighed quantity of the powdered rhizome and rootlets, macerated in rectified spirit for four days, gave a tincture of a light yellowish-brown colour which left 27 per cent. of extract when evaporated to dryness. The extract washed with cold water lost a considerable amount of bitter colouring matter and glucose, and a resinous residue was left amounting to 10 per cent. of the drug. Another estimation was made of a fresh supply, and it was found that by exhausting the powdered drug with rectified spirit over 30 per cent. of extract was obtained, and after being washed with water acidulated with hydrochloric acid, 12 per cent. of resin or resins remained insoluble. The resin was amorphous, pale orange-brown in colour, darker if dried at a high temperature. It was soluble in alcohol, ether and chloroform, and almost entirely so in ammonia water. It was reprecipitated from its alcoholic solution by water, and from its alkaline solutions by acids. The tincture of the drug gave a deep olive-green colour with ferric chloride, and caused a reduction of cupric oxide in Fehling's copper reagent. It left no ash when incinerated.

Podophyllum peltatum, according to the 'Pharmacographia,' yields 2 per cent. of purified resin. From the records of the American drug manufacturers it seems that 3½ to 5 per cent. is the average yield of the so-called "podophyllin."

Physiological Action.—It only remained to test the medicinal activity of the drug, in order to compare it with the May apple. It was found that ½ a grain of the resin, mixed with a little sugar, produced unmistakable cathartic effects in the course of a few hours. A slight griping sensation was experienced; this usually attends the administration of podophyllin when not combined with aromatics or carminatives.

As there is such a great resemblance between the Indian and American species of *Podophyllum* in their botanical and technical characters, and as the former yields such a large quantity as 10 to 12 per cent. of an active principle, and is at present a drug almost entirely unknown, it is desirable that attention be drawn to such a promising and useful medicinal agent.

NOTE ON THE MOLYBDATE TEST FOR HYPOPHOSPHITES.

BY E. J. MILLARD,
Pharmaceutical Chemist.

In several text-books of pharmaceutical chemistry, and also in the National Dispensatory by Stillé and Maisch, ammonic molybdate is stated to give a blue precipitate with hypophosphorous acid and the hypophosphites. No details of the reaction are given, although it is recommended as a test.

As far as I have been able to ascertain, the test is founded on the observations of Winkler,* at least he is the earliest authority on the subject, for in 1850 he mentions that hypophosphites are coloured blue by molybdate of ammonium, and that a mixture of phosphate with hypophosphite yields a green coloration, owing to the combination of yellow phosphomolybdate with the blue.

Now, in common with many others, I have never been able to get a blue precipitate, when solutions of the two bodies are mixed, and only a faint coloration appears after standing some considerable time, nor does the fact of the solution of the molybdate being acid, neutral or alkaline, make any difference in this result.

Whilst experimenting with solutions of ammonic molybdate and hypophosphites, I noticed that the addition of a small quantity of sulphurous acid rendered the inoperative test a most delicate one. Moreover, the ordinary nitric acid solution of

* Poggendorff's 'Annalen d. Physik u. Chemie,' Band cxi., p. 443.

molybdate of ammonium, used as a test for phosphoric acid, answers even better than a neutral or alkaline solution. For, if to a solution of hypophosphorous acid or any of the hypophosphites the acid solution of ammonic molybdate be added, and then a few drops of sulphurous acid, a blue precipitate is immediately formed, or if the solution be dilute, a blue coloration is produced which is considerably intensified by agitation or gentle warming.

Phosphoric acid and the phosphates, phosphorous acid and the phosphites similarly treated do not react, neither do pyrophosphates.

The reaction is, I believe, due to the partial reduction of MoO_3 to Mo_3O_8 by the hypophosphorous acid, which is completed by the sulphurous acid. This blue oxide has been shown by Pfordten* to exist between colourless MoO_3 and brownish MoO_2.

It may be thought that any reducing agent, as SH_2 or $SnCl_2$, would answer equally well, and perhaps reduce the molybdate without the presence of hypophosphorous acid being necessary. These reagents, however, carry the reduction too far, namely, to the brown state.

Alkaloïds, including morphine, and most salts, with the exception of chlorates, sulphides and thiosulphates, do not affect the reaction.

Chlorates prevent the reaction, sulphides produce a brown-black coloration that would completely hide it, and thiosulphates reduce the molybdate to the brown state. Each of these, however, if treated by boiling well with dilute acid, preferably hydrochloric, cooling and then adding the reagents, will react properly. Excess of alkali prevents the coloration showing until acidified; strong mineral acids spoil the reaction, but dilute acids fail to interfere. Boiling causes the precipitate and colour to disappear, but if cooled again and more sulphurous acid added the colour reappears.

In pure solutions the reaction is very delicate, it being possible on gently warming to detect 1 part of H_3PO_2 in 2000, whilst the well-known cupric reaction fails completely.

In mixtures and in the presence of acids, etc., about 1 in 300 is the limit. It forms a splendid lecture experiment, as the colour is very fine and deep.

I may add that ammonic tungstate reacts in exactly the same manner as the molybdate does.

* *Journ. Chem. Soc.*, Abstracts, 1884, page 559.

NOTE ON SYRUP OF HYDROBROMATE OF IRON AND QUININE, B.P.C.

BY R. A. CRIPPS.

This syrup, as well as that with strychnia, contains, when freshly prepared, one grain of acid quinine hydrobromate in the fluid drachm. Having made several quantities of this syrup, I have noticed shortly after preparation, the time varying according to the temperature at which the syrup is kept, but generally in less than a fortnight, crystals appear on the sides and bottom of the bottle.

On examination, these crystals prove to consist of acid quinine hydrobromate, which would suggest that these syrups should be made considerably weaker. A small quantity of the syrup was also prepared, containing half-an-ounce of hydrobromic acid B.P. to the pint, in excess of the prescribed quantity, but the deposition of crystals was not in the least retarded. A syrup of acid quinine hydrobromate, 1 gr. in 1 fl. drm., made without iron, but otherwise exactly like the B.P.C. syrup, has yielded *no* crystals after about a month, although kept in a cold place.

The syrup with iron does not lose strength if made two-thirds of the B.P.C. strength in regard to *quinine*.

DETECTION OF COTTON-SEED OIL IN OLIVE OIL.*

BY E. HIRSCHSOHN.

The production of cotton-seed oil, which twenty years since was as good as unknown, has in recent years assumed an enormous development, and it is frequently used, after being freed from stearin, for the adulteration of more valuable oils, especially olive oil. This manipulation takes place in Italy on a large scale, so that the Italian Government has sought to control the practice by increasing the duty on cotton-seed oil, and appointed a committee for the purpose of finding a method which would allow of the easy detection of cotton-seed oil in olive oil.

The dark colour that cotton-seed oil gives with some acids has in various quarters been recommended, not only for the recognition of the oil, but also for its detection in mixtures. Conroy† used a nitric acid of sp. gr. 1·42, Bach‡ one of sp. gr. 1·3, and Marie one of sp. gr. 1·5, for the detection of an addition of cotton-seed oil to olive oil, on the ground that cotton-seed oil upon being shaken with nitric acid gives a brown colour, whilst in pure olive oil none is observed. According to the statement of Dieterich,§ with a nitric acid of 1·4 sp. gr., the presence of 10 per cent. of cotton-seed oil can be recognized.

Rödiger‖ bases his method for the detection of cotton-seed oil upon the presence of an unsaponifiable yellow body. A sample of the oil to be examined is saponified with alkali and the perfectly dry soap is extracted with benzine, which upon evaporation, if cotton-seed oil be present, leaves drops of a yellow substance.

Becchi,¶ on the other hand, utilized the reducing properties of cotton-seed oil for its recognition in mixtures and recommended that the oil to be tested should be heated in a water-bath to 84° C. with five times its volume of 98 per cent. alcohol and a similar volume of a solution of 1 gram of silver nitrate in 100 c.c. of alcohol. Pure olive oil should undergo no change of colour, but in the presence of cotton-seed oil a darkening of the mixture takes place.

Geissler pointed out that cruciferous oils also, in consequence of the sulphur they contain, may give rise to a blackening of the silver solution, as well as oils that have been extracted by means of carbon bisulphide. Becchi subsequently modified his process and recommended that 10 c.c. of the oil to be tested should be treated with 1 c.c. of silver solution (prepared by dissolving 1 gram of silver nitrate in 200 c.c. of 98 per cent. alcohol and 40 c.c. of ether and filtering) and 12 c.c. of a mixture of pure amylic alcohol with 15 per cent. of rape oil, then shaken well and heated a quarter to half an hour in a water-bath.

Bizio found that several oils have the power to reduce silver nitrate in ether-alcoholic solution, and uttered a warning against the use of this method.

* Translated from the *Pharmaceutische Zeitschrift fur Russland*, Nov. 13, p. 721.

† *Pharmaceutical Journal* [3], xi., 933.

‡ *Chemiker Zeitung*, vii., 355; *Jahresb. f. Pharm.*, 1883–84, p. 624.

§ *Jahresb. f. Pharm.*, 1886, p. 183.

‖ *Chemiker Zeitung*, v., 623; *Jahresb. f. Pharm.*, 1881, p. 511.

¶ *Jahresb. f. Pharm.*, 1883 84, p. 629.

Last year Milliau published a method by means of which even 1 per cent. of cotton-seed oil can be detected. He also availed himself of the reducing property of the oil towards silver nitrate, with the difference that he allowed the separated fat acids, and not the oil itself, to act upon the silver solution. According to his directions about 15 c.c. of the oil is saponified by means of soda solution and alcohol, the soap dissolved in water and decomposed with dilute sulphuric acid. Then 5 c.c. of the separated fat acids is dissolved in 20 c.c. of 92° alcohol in a water-bath, and 2 c.c. of silver nitrate solution (3 grams in 100 c.c. of water) added and heated in a water-bath until about one-third of the whole has evaporated.

The above-mentioned methods for the recognition of cotton-seed oil in mixtures are not only uncertain, but require considerable time for carrying them out, so that it would be important to be in possession of a method that would allow of this object being attained rapidly and with certainty.

Some time ago I made the observation that a solution of gold chloride in chloroform (1 gram of crystallized gold chloride dissolved in 200 c.c. of chloroform, sp. gr. 1·485), used by me for other purposes, gave with cotton-seed oil upon warming an intense raspberry-red colour; on the other hand, with pure Provence oil no such colour was observed. In order to apply this observation in the detection of cotton-seed oil I made a series of experiments to ascertain the conditions necessary to obtain a good result. The best manner of proceeding was found to be as follows:—To 3–5 c.c. of the oil, placed in a thin test-tube, are added 6–10 drops of the above-mentioned gold chloride solution, and after mixing the test-tube is placed in boiling water and watched for about fifteen or twenty minutes. In the following paragraphs I have described the appearances noticed in a series of fixed oils treated according to this method.

Arachis Oil.—Of this oil I only had four samples at my disposal and in these no coloration was perceptible after being heated for twenty minutes, but there was a slight separation of gold.

Cotton-Seed Oil.—Three samples, produced in different years, gave already after about two minutes a rose colour, which after five minutes passed to an intense cherry-red.

Hemp Oil.—Two samples were tested, one of which had become quite thick. No change was perceptible in either after twenty minutes.

Linseed Oil.—Four samples were at my disposal, two of which were much oxidized. The same result was obtained as with hemp oil.

Poppy-Seed Oil.—A dark and a pale sample were tested, in neither of which was any coloration perceptible.

Almond Oil.—An oil from sweet and one from bitter almonds were tested, as well as an oil from peach kernels, but no alteration was recognized.

Olive Oil.—Five samples of olive oil and eight samples of Provence oil employed in these experiments gave neither coloration nor separation of gold. In one of two samples of Provence oil, from another source, a rose colour was observed after two minutes, and in the other after four minutes: these contained a considerable quantity of cotton-seed oil.

Rape-Seed Oil.—Only one sample was examined, which after an hour showed no change.

Colzà Oil (refined).—One sample pressed in Russia and one French oil were tested. They behaved alike and showed no change.

Castor Oil.—Six different samples were examined, and no coloration was observed in any; but in some, after twenty minutes, a slight separation of gold was found to have taken place.

Mustard Oil.—Two samples from different sources gave, after twenty minutes, neither coloration nor separation of gold,

Sesame Oil.—Six samples were examined and in none was any change perceptible.

Sunflower Oil.—Only one sample was tested and this behaved indifferently towards gold chloride.

Grape-Seed Oil.—Only one sample was tested and with negative results.

It is apparent from these experiments that all the fat oils at present tested, with the exception of cotton-seed oil, behave indifferently towards gold chloride or give no perceptible colour; it would seem therefore that gold chloride affords a suitable and easy means of distinguishing cotton-seed oil from other oils.

In order to form a judgment whether and in what quantity cotton-seed oil could be detected in other oils, mixtures of the above-named oils with 10 and 20 per cent. of cotton-seed oil were prepared, and these were subjected to the same treatment. The results obtained are set forth in the table below.

A glance at this table shows that cotton-seed oil cannot be detected in all oils by means of gold chloride, even in mixtures containing 20 per cent.,

Oil.	*With* 10 *per cent. of cotton-seed oil added.*	*With* 20 *per cent. of cotton-seed oil added.*
Arachis	After 15 minutes bluish; 20 minutes blue and reduction.	After 7 min. reddish streaks; 20 min. blue and separation of gold.
Hemp	After 5 min. brown; 20 min. brown, no reduction.	After 5 min. reddish; after 15 min. blood red.
Linseed	After 20 min. no change; the oil is green and slight reduction.	After 20 min. green and separation of gold.
Poppy-seed . . .	After 5 min. rose; after 10 min. blue; 20 min. green and separation of gold.	After 5 min. rose; 10 min. blue-violet; 20 min. blue and separation of gold.
Almond	After 15 min. rose; after 20 min. light violet.	After 8 min. rose; after 20 min. raspberry red.
Olive	After about 4 min. rose; after 20 min. raspberry red.	After about 3 min. rose; after 20 min. raspberry red.
Rape	After 20 min. no change.	After 20 min. no reaction.
Colza, refined . .	After 15 min. rose; after 20 min. red.	After about 7 min. rose; 20 min. raspberry red.
Castor.	After 5 min. rose; after 20 min. blue and separation of gold.	After 5 min. rose; after 20 min. blue and separation of gold.
Sesame	After 5–6 min. rose; 20 min. raspberry red.	After 5 min. reddish; after 20 min. intense violet.
Mustard	After 20 min. no coloration, but separation of gold.	After 20 min. no coloration, but reduction.
Sunflower . . .	After 10 min. bluish; after 20 min. green and separation.	After 7 min. reduction and green; 20 min. green.
Grape-seed . . .	After 20 min. no perceptible change.	After 15 min. reddish; after 20 min. red, brown.

and especially in drying oils. On the other hand it allows of the easy recognition of 10 per cent. in arachis, poppy, rape, castor, olive, sesame and sunflower oils, and with most precision in olive, sesame and almond oils.

In order to ascertain whether still smaller quantities of cotton-seed oil in olive oil could be detected in this way, mixtures were prepared containing 1, 2, 3, and 5 per cent.

Provence oil with 1 per cent. of cotton-seed oil: after 15 minutes rose; after 20 minutes light violet.

Provence oil with 2 per cent.: after 10 minutes rose; after 20 minutes blue violet.

Provence oil with 3 per cent.: after 8 minutes rose; 20 minutes blue violet.

Provence oil with 5 per cent.: after 6 minutes rose; 20 minutes raspberry red with a shade of blue.

It follows therefore that an addition of 1 per cent. of cotton-seed oil to Provence oil can be detected, and the quantity of the admixture can be recognized approximately, if regard be paid to the coloration and time.

On the ground of the foregoing observations I recommend the following process for the rapid and convenient detection of an admixture of cotton-seed oil with olive oil.

3–5 c.c. of the oil to be tested is placed in a thin test-tube, 6–10 drops of a solution of 1 gram of crystallized gold chloride in 200 c.c. of chloroform added, well mixed, and the tube placed in boiling water and watched for about 20 minutes, during which time no red coloration should take place. I use a glass beaker as a water-bath, in order to be able conveniently to observe the colour.

THE RESEARCH LABORATORY OF THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN:—AN EXPERIMENT.*

BY G. F. SCHACHT.

"The advancement of chemistry and pharmacy" is one of the fundamental reasons for the existence of the Pharmaceutical Society of Great Britain. The words stand among the first lines of its Charter, and are quoted in the Acts of Parliament that define its rights and prescribe its duties.

The governing body of the Society (a Council elected by the members in accordance with the provisions of those Acts), amid the many duties therein imposed, and which need not here be detailed, has constantly recognized this one, and to its best ability has endeavoured to fulfil it.

The means and methods by which science can be promoted may be numerous and varied, but they appear to divide themselves naturally into two groups —those which aim to train up the many to the knowledge of the few, and those which would assist the few to pursue their search for knowledge into the regions of the unknown.

Naturally, also, the former would first claim the attention of a body of practical men, and hence we read, with no surprise, that as early as the first year of the Society's existence, 1841, it had settled its home, had got together the nucleus of a Museum, had selected the first volumes of a Library, had issued the first numbers of a Journal, and had started systematic courses of lectures in the sciences connected with pharmacy, namely, chemistry, botany and materia medica; and that in 1845 it opened a Laboratory for practical chemical instruction under the direction of a Professor.

These have all grown and developed in importance with time, and at the present moment the scientific staff of the Society includes a Professor of Chemistry, a Professor of Practical Chemistry—who is chief in the Laboratory—a Professor of Botany, a Lecturer and Demonstrator of Materia Medica, a Lecturer and Demonstrator of Practical Pharmacy, a Curator of the Museum and a Librarian.

Here is our Calendar, here is the last edition of the Catalogue of our Library, and here is a descriptive catalogue of our Museum.

In the present session there are—

42 students attending the chemical lectures.
48 ,, ,, botanical lectures.
49 ,, ,, practical lectures.
39 ,, ,, materia medica lectures.
52 ,, ,, practical pharmacy lectures.

and sixty are working in the chemical laboratory.

It may also be mentioned that the Society awards annually three scholarships, two of them of £30 each, with free lecture and laboratory instruction, and distributes medals and other prizes of value to successful competitors at the end of the sessions.

I venture to hope it may be fairly claimed for those who have thus managed the Society's affairs, that as regards the side of their duty which aims at the distribution and dissemination of knowledge, they have been fairly active.

Nor have they altogether failed of effort on the other side, namely, in encouraging research.

By the institution of periodic evening meetings for the reading and discussion of original papers, and by the free offer of the columns of their Journal they have at least provided a fair arena for publicity and criticism.

And in special memory of one of the great ornaments of pharmacy—the late Mr. Daniel Hanbury—they have instituted a "Hanbury Gold Medal," which is awarded biennially for high excellence in the promotion or prosecution of original research in the natural history of drugs. That the medals have been awarded in a fairly Catholic spirit may be inferred from the list itself of those who have received them: 1881, Professor Flückiger, of Strassburg; 1883, John Eliot Howard; 1885, Professor Dragendorff, of Dorpat; 1887, Surgeon Dymock, Bombay army. But they have ever felt that in this direction much more might be done, and an earnest desire has long existed for some practical scheme having for its first object the investigation of problems in pharmaceutical science hitherto unsolved. And a hope has gradually been created that if a wisely-managed home of research were established and maintained by the representatives of pharmacy, their action might lead to similar or corresponding efforts by public bodies representing other sides of the medical art, and that thus not only might the knowledge of abstract science be enlarged, but new opportunities might be afforded for the advancement of that great practical desideratum—a true science of medicine!

These ideas have, as I have said, long prevailed in the minds of many members of the Council, but until recently no good opportunity has presented itself for giving them practical form. The acquisition, however, of some additional premises seemed to present a favourable chance, and it has been turned to account in the following manner:—

Certain rooms in the new buildings, quite distinct from the ordinary laboratory of instruction, have been equipped and furnished as research laboratories. £300 were voted for their equipment.

The Council has appointed a small Committee of its own members, who, with the aid of certain outsiders, to be spoken of presently, are to settle and manage the scheme. It has granted to this Committee £300 a year for three years to expend as it thinks best for the purpose, a few general instructions being laid down for its guidance.

This Committee, which entered upon its duties in

* A paper read (by request) before the Physical and Chemical Section of the Bristol Naturalists' Society at the University College, Bristol.

the early part of last year—1888—has elaborated its scheme, has appointed its staff, and approved certain subjects of work which have either been completed or are still in progress.

And of these matters I will now give you some details. First, the scheme; second, the staff; third, the work done.

Scheme for the Management of the Research Laboratory.

Objects.

1. The Laboratory is founded for the advancement of pharmacology by research. It shall under certain conditions be available for the purposes of investigation and research in chemistry, and other branches of science in their relation to pharmacology, to all persons who possess the requisite scientific training.

Government.

2. The Government of the Laboratory shall be vested in the Council.

3. The management of the Laboratory shall be under the supervision of a committee to be elected annually by the Council. The Committee shall consist of the President and Vice-President and two other members of Council, with power to nominate four persons (not necessarily members of Council or of the Society).

4. The Committee, of whom four shall be a quorum, shall meet from time to time to transact such business as may be necessary for the proper management of the Laboratory.

5. The Laboratory shall be for the time under the immediate management of a director who shall be appointed annually by the Council. He shall be from time to time furnished, on application to the Committee, with all the apparatus and materials necessary for investigations. In carrying on research he shall be at liberty to employ an assistant to be named by him and approved by the Committee.

6. The director shall be responsible to the Committee for the proper management of the Laboratory, and shall submit to the Committee a quarterly report of the work done in the Laboratory.

Regulations for the Laboratory.

7. Any person who desires to assist in the researches undertaken by the Director or who wishes to pursue an investigation on his own account may be admitted into the Laboratory as a Worker by the Committee on the nomination of the Director, to whom written application is to be made for the purpose.

A worker who desires to remain engaged in investigation for more than one year shall renew his application for admission each year.

8. Each worker will be expected, before his admission, to satisfy the Director of his competency, and if he wishes to undertake any particular investigation he must also furnish a statement in writing of its nature and extent.

9. Every worker will be furnished with gas and water, and at the discretion of the Director with such materials and apparatus as the worker may require. He will be expected, on being called upon by the Director, to reinstate such apparatus as he may damage.

10. No inquiry having a direct commercial object shall be conducted in the Laboratory.

11. The selection of subjects for investigation shall be left to the discretion of the Committee, assisted by the Director. The Director shall allow the utmost freedom to each investigator in the methods of research pursued by the latter, so far as they are consistent with the orderly government of the Laboratory. No publication of any research shall take place without the sanction of the Committee and Director, and in all cases the words "Communication from the Research Laboratory of the Pharmaceutical Society of Great Britain," or their equivalent, shall be appended to the title of each paper.

12. A report of the work done shall be annually presented by the Committee to the Council.

13. The Director shall have power (for any sufficient cause) to order a worker to cease to use the Laboratory at any time or immediately, but the worker shall have a right of appeal to the Committee, whose decision shall be final.

The Research Committee.

The President, Mr. Carteighe; the Vice-President, Mr. Bottle; Mr Greenish, Mr. Schacht, and outside the Council, Mr. Ekin, Professor Michael Foster, Dr. Lauder Brunton, Dr. Frankland.

Staff.

Professor Dunstan (Director), Assistant, Mr. Dymond.

The Work Done.

This might be properly referred to under two headings, investigations of which reports have been presented, and investigations still in progress. Of the former we have had as follows:—

A report upon the preparation of pure ethyl nitrite, by Professor Dunstan and Mr. T. S. Dymond. Chemical Observations on Tartar Emetic, by Professor Dunstan and Miss Boule: 1. Volumetric Estimation; 2. Action of Alcohol on Aqueous Solutions; 3. Specific Rotation of Aqueous Solutions; 4. Preparation of the Pure Salt. Chemistry and Pharmacology of the Nitrites of the Paraffin Series, by Professor Dunstan and Messrs. E. S. Woolley and W. L. Williams; 1. Isobutyl Nitrite; 2. Metameric Amyl Nitrites; 3. Constitution of Official Amyl Nitrite: The Comparative Effects of "Spirits of Nitrous Ether" and Solution of Ethyl Nitrite, by Professor Leech, M.D.; Note on the Effect of Iso-Amyl Nitrite, by Dr. Lauder Brunton, F.R.S.; The Physiological Action of the Nitrites of Iso-butyl and Amyl, by Professor Cash, M.D. (a preliminary notice only of this investigation has as yet been received).

With reference to the work still in progress, I am informed that it is upon subjects of equal importance with those already named; but the Director very properly requests me to speak only of that which has been actually completed.

The report of the work upon tartar emetic is perhaps of more practical interest to the pharmacist than to the scientific chemist; nevertheless, points of much general chemical interest were elucidated during the investigation.

For instance, the special conditions under which the volumetric process for the analysis of antimonious salts by their reactions with iodine becomes reliable were well examined. The exact nature of the precipitate obtained by the addition of alcohol to solutions of tartar emetic was determined; and the power of rotating the plane of polarization possessed by solutions of this salt was accurately measured; with the observation that that power is remarkably greater than that of similar solutions of the commonly occurring tartrates. The contribution is therefore from all points of view a gain to science.

With regard to the series of papers on the organic nitrites we have the declared opinions of Professor Michael Foster, Professor Armstrong and Dr. Burdon Sanderson, who took part in the discussion that followed their being read, that they were of high quality as chemical investigations and of much practical value to scientific medicine. I will venture an attempt to summarise them.

Ethyl nitrite has been long employed in medicine in a dilute and indefinitely impure form, under the title "spiritus ætheris nitrosi."

Old pharmacopœias directed the preparation to be made by distilling a mixture of spirit of wine and nitric acid, and though our present Pharmacopœia

prescribes a process which is a distinct improvement upon the older ones, namely, the distillation of a mixture of spirit of wine, sulphuric acid, nitric acid and copper wire, it will be easily understood by chemists that though the distillate will probably contain some ethyl nitrite, the proportion will vary according to the conditions under which the operation is performed; and they will also detect that sundry other bodies will certainly present themselves that are not so welcome, such, for instance, as aldehyd, paraldehyd, and free nitrous and nitric acids.

The fact that spiritus ætheris nitrosi of the British Pharmacopœia is really a curious and very variable mixture of substances has of course been well known for long, and indeed there have been those who thought it more than probable that the medicinal effects of the preparation were attributable rather to these companions of the ethyl nitrite than to the ether itself.

The first object, therefore, of the investigation was to devise a process for the easy preparation of pure ethyl nitrite, and to suggest a solution of definite strength and good keeping power; and then to place such a preparation into the hands of some competent pharmacologist who would be willing to compare the effects of this definite solution with those of the old mixture.

Professor Dunstan and Mr. Dymond, as I have said, accomplished the chemical portion of the problem, and Dr. Leech, Professor of Pharmacology at Manchester, the latter. The respective papers are published in the *Pharmaceutical Journal.*

The investigation of the other nitrites of which mention has been made was due, in great part, to the frequent assertions of observers that the effects produced by different samples of amyl nitrite varied greatly.

This article is directed in the Pharmacopœia to be prepared "by acting on amyl alcohol (rectified fusel oil) with nitric or nitrous acid;" and the resulting amyl nitrite is described as "having a sp. gr. of 0·880 and to lose about 70 per cent. by distillation between 90°–100° C."

Upon examining the best samples thus produced it was found that they were all mixtures of various bodies —nitrites of other bases besides amyl, alcohols of more than one kind, nitrites, aldehyds, and acids.

The task of isolating the ingredients of such mixtures when once formed appeared to be quite hopeless, and efforts were therefore made to prepare, in the first case, the pure alcohols themselves, and then to convert them into the respective nitrites of their radicles.

A complication attends this kind of investigation, arising from the known fact of the existence of some of these alcohols in polymeric conditions. But Professor Dunstan and his fellow workers have succeeded in separating, and finally, purifying from fusel oil, four well-defined alcohols, viz.:—

Primary propyl alcohol, C_3H_8O, b.p. 97·4.
Iso-butyl alcohol, $C_4H_{10}O$, b.p. 108·4.
α-amyl alcohol, $C_5H_{12}O$, b p. 131·0.
β-amyl alcohol, $C_5H_{12}O$, b.p. 128·0.

And from each one of these they have prepared the corresponding nitrite.

For the details of the processes employed I must refer to the papers themselves, but in outline I may state that they consisted in the conversion of the mixed alcohols into double sulphates of barium, the separation of the resulting salts by virtue of their varying solubilities and the final recovery of the alcohols from the salts. The purification of the several salts by many crystallizations is described as being very tedious and occupying much time, but as yielding at last alcohols of constant boiling points.

For the production of the nitrites the process adopted was to avoid distillation and even heating altogether, and to mix at an appropriately cold temperature a proper proportion of the alcohol with sulphuric acid, and to add the mixture, still keeping all cold, to a solution of sodium nitrite.

The organic nitrite separates as a layer upon the surface of the mixture, nearly pure, requiring only to be washed and dried with dry potassium carbonate.

The Pharmacological Reports are of much interest. Professor Leech declares that ethyl nitrite is really the active agent in the old remedy; and it would thus appear that an improved Pharmacopœia process is required, having for its aim a definite and stable solution of that chemical, to take the place, perhaps, of the uncertain and unscientific mixture called spiritus ætheris nitrosi.

Professor Cash and Dr. Lauder Brunton report upon the pharmacology of the other nitrites. In the midst of these reports appears an extremely interesting fact.

It has been very generally believed that when similar physiological effects attend the exhibition of a series of remedies that have for each other a relation of chemical gradation, their potentialities are in proportion to the complexity of their molecules.

We should therefore expect a gradually increasing power in these nitrites, corresponding to the number of carbon atoms in the molecule, and that therefore the amyl nitrite would be more potent than those occupying a lower position in the series.

It appears, however, from the observations of these investigations that such is not the case; but that iso-butyl nitrite which contains but 4 atoms of carbon is more potent than either of the amyl nitrites, whose molecules contain 5 atoms of carbon.

And it would thus appear that a further improvement in our authorized code of remedies might be adopted by the substitution of pure iso-butyl nitrite for the mixture which at present goes by the name of amyl nitrite.

This finishes the story of our experiment, as far as a single year's existence has enabled us to pursue it. I shall not ask for any verdict as to its success or failure, —the time for that has not yet arrived,—but I hope you will recognize in what we are doing an effort in the cause of science, and that you will be able to accord us a word of encouragement.

THE HUNGARIAN DAISY AS AN ADULTERANT OF INSECT POWDER.*

BY G. M. BERINGER, A.M., PH.G.

A short time ago, there was received in New York a consignment, consisting of a number of bales of these Hungarian daisies. They were entered at the Custom House as insect flowers and were evidently intended as a sophistication of the Dalmatian insect powder. In the course of business, a sample of these flowers was submitted to the writer.

The similarity in size and general appearance to the flowers of the Dalmatian powder, would easily deceive the careless or unguarded observer. On close inspection, however, with a microscope of ordinary powers, the differences in the botanical structure are such as to render the distinction between the whole flowers comparatively easy. But as they will, probably, in future importations, be mixed with the genuine, which usually, as imported in bales, are very much broken up, they will prove a dangerous adulterant, one difficult to determine, and if in the powdered article most likely beyond detection.

The Dalmatian insect powder has proven so superior to the Persian powder, that it has driven the latter almost entirely out of the market. It is said to be the most valuable product of Dalmatia, and is now imported in very large quantities. As imported, it is

* Read at the Pharmaceutical Meeting, Philadelphia, Dec. 18. From the *Amer. Journ. of Pharm.*, January.

usually adulterated with the ground stems and leaves of the plant. The latter being cut down at the end of the season, dried, ground and mixed with the ground flowers in the proportion of one to three or four of the flowers. This accounts for the fact that the whole flowers are usually quoted at the same price and frequently at an advance on the price of the powder. The adulteration of this product with Hungarian daisy, is deemed of such importance as to be worthy of record and prompt exposure.

The present editions of the Dispensatories contain but indifferent descriptions of this drug. The following descriptions are offered with the hope that they may serve to distinguish the two.

Hungarian Daisy.—Stems angled, the dried flower heads averaging about half-inch in diameter, the rays florets being twisted and folded. When soaked in water to their natural size, the flower heads average 1¼ inch in diameter from tip to tip of the ray florets. The involucre broadly campanulate, imbricate, the scaly margins chaff-like, the stem being deeply inserted makes it distinctly depressed or concave; greenish-grey in colour, glabrous. Receptable prominent, subglobular, convex, dark-coloured. The ray florets (about 18), white, ligulate, nerved, three-toothed, pistillate; the appendages of the style extending beyond the tube. The achenia angled, without pappus, but crowned with a faint margin. The disk florets numerous, bright orange-yellow, tubular, five-toothed, the stamens included; achenia without pappus.

The botanical characteristics of this flower would indicate that it most probably belongs to the sub-genus leucanthemum; but, with only the flowers for examination, the naming of the species would be but a guess of little or no value.

Chrysanthemum cinerariæfolium, Bocc. (*Pyrethrum cinerariæfolium*, Treviranus)—*Dalmatian Insect Flower.* Stem angled, the whole flower head ashy gray in colour and quite pubescent. When dried the flower heads are from ¼ to ⅜ inch in diameter, the ray florets being twisted and folded and frequently broken off. When soaked to the natural size, about 1¼ inch in diameter, including the ray florets. The involucre imbricate, the scaly margins membranous, campanulate and convex without depression at place of attachment to stem. The receptacle small, conical, naked and solid and light greenish-gray in colour. The ray florets, (about 18) white, ligulate, nerved, three toothed, the tube pubescent, pistillate; the appendages of the style protruding beyond the short tube. The achenia crowned with a membranous, notched (eroded) pappus. The disk florets, numerous gray tending towards light yellow in colour, tubular, five toothed, the stamens included. The achenia angled, nearly as long as the tube and also crowned with a notched pappus. The florets of the true insect powder are somewhat larger than those of the Hungarian Daisy.

The Hungarian daisy is distinguished from the true pyrethrum by the orange yellow disk florets, by the depression of the involucre, by its prominent dark receptacle and the absence of pubescence and pappus. The odour is less pungent than that of the true insect flower, being more like that of matricaria. The difference in odour is more pronounced on infusing in warm water. The Hungarian daisy yields a powder somewhat darker in colour. This powder used upon flies and cockroaches appeared to have no value as an insecticide. Microscopically no difference could be detected between the two powders.

	Chrysanthemum cinerariæfolium.	Hungarian daisy.
Petroleum ether. .	2·49 p. c.	3·37 p. c.
Ether	2·85 „	2·68 „
Alcohol.	6·57 „	9·45 „
Water	16·70 „	13·43 „
Ash	6·50 „	9·30 „

Time and the amount of material at my command would not permit of a thorough chemical examination, but it was hoped that the percentage of extractive matter obtained with various solvents might furnish a useful comparison. The foregoing statement exhibits the results obtained.

CACAO CULTIVATION IN COLOMBIA.*

Cacao is one of the most important articles of production in Colombia. It is in daily use in every household, rich and poor, in every district of the country, to quite as great an extent as tea is in England. The departments of Tolima and Cauca produce the greatest quantity, but it is more or less grown in every part of the hot country. It is mostly planted on newly disforested land, on the slopes of the mountains, at an elevation of from 1000 to 3500 feet. The variety chiefly grown in Colombia is different to that of Venezuela, which produces the Carácas cocoa, the pods being much larger and containing a greater number of beans; but as the number of pods produced by a tree is smaller, it is probable that on the whole the Venezuelan variety is the more productive of the two. The quality of the Colombia cacao is little, if at all, inferior to that of the Venezuelan, but it is little known in commerce, as only an insignificant amount is exported, the supply scarcely satisfying the demand of the country. It is cultivated here in much the same way as in Venezuela, though perhaps less care is generally taken here to keep the plantations in proper order. It is a crop which requires constant care and labour to weed and clean the ground, and free the trees from the numerous insects, especially caterpillars, which infest them. A most destructive disease has lately attacked the cacao trees in the south of the Tolima, which is one of the richest districts of Colombia. One plantation of 12000 trees near Chaparral, produced only 175 pounds of cacao in 1887, instead of some 18000 pounds, which at 1½ pounds a tree would be a fair average crop, according to the general calculation here. These trees were sixteen years old, and therefore in their prime; some cacao trees, if healthy, bear for from sixty to eighty years. No investigations seem to have been made into the nature of this disease, and no remedy has been suggested. Meanwhile, the cacao industry over a large portion of the most productive district of the country seems to be threatened with entire ruin. The cacao tree begins to bear in three and a half years in the hottest districts, and in five years at an altitude of 3500 feet. It is carefully shaded for the first year; plaintains, or more rarely sugar cane, being planted for the purpose. Trees are also planted, which as they grow up give permanent shade to the plantations; a species of *Erythrina* is most commonly used for this purpose on account of its rapid growth. Cacao is one of the most, perhaps the most, paying crop grown in the country when once it is established; but the initial cost of planting it and keeping the plantation in good order for the first four or five years deters many people from growing it. As compared with coffee, a plantation of cacao of a given number of trees costs nearly twice as much to establish; but once in full bearing, it has the great advantage that no machinery and very little labour is required for preparing the beans for the market, so that the profits are much greater. If land, however, were not so cheap as it is in most of the cacao districts, coffee would have a great advantage, since four times as many coffee trees can be planted to the acre as cacao trees, and the value of the produce of a given number of cacao trees is only from two to two and a half times as great as that of the same number of coffee trees; but as the value of land is merely nominal, cacao is the more profitable crop of the two.

* From a Consular Report on the Agricultural Condition of Colombia.

The Pharmaceutical Journal.

SATURDAY, JANUARY 26, 1889.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

PHARMACEUTICAL EDUCATION IN PROVINCIAL CENTRES.

IT is with much pleasure that we take this opportunity of pointing to the work being done by the Sheffield Pharmaceutical and Chemical Society for the promotion of pharmaceutical education, because the steps taken with that object appear to us to evince a sound appreciation of what is really necessary to bring about an improvement in the position of pharmacy and its cultivators. On previous occasions we have spoken of the Sheffield School as having been one of the most successful attempts to furnish opportunity for acquiring knowledge of those scientific matters which are indispensable for the pharmacist who has any desire to take rank above an ordinary shopkeeper, and it is pleasant to learn that the efforts made in that direction are still being attended with success so far as the classes are concerned. But while there is room for congratulating those who have taken an active part in this work upon the success they have attained under the unfavourable conditions now existing, there is still greater reason for congratulating them upon having taken a sensible and matter of fact view of the present situation and its requirements. They have not been content with launching a school and establishing a series of classes with some inauguratory flourish, but they have had an eye to the maintenance of the school and its continued efficiency for teaching. They have also recognized the fact that while education of a technical nature continues to be regarded as a matter of questionable necessity and of doubtful value, the only way in which it can be hoped to sustain a school of pharmacy is by liberally subsidizing it and to a large extent providing the means of defraying its cost. This is the course that has been followed for the past forty years by the Council of the Pharmaceutical Society, acting on behalf of the members throughout the country in regard to the School at Bloomsbury Square, and during that period the contributions of members of the Society to the maintenance of that School have laid those who partook of its benefits under a lasting obligation.

But the maintenance of a central school of pharmacy has long been felt to be inadequate for the full satisfaction of the educational needs of the younger members of the pharmaceutical body. Provincial schools are also needed, perhaps even more needed than a central school. The attempts that have been made to found such schools have hitherto in most instances been little short of failures, and the scheme for supporting such schools by means of periodical grants from the Society's funds has been found to lay too heavy a tax upon its subscribing members to admit of being generally carried into execution. The members of the Sheffield Society recognizing this fact, and the equally important fact that the promotion of pharmaceutical education is a duty to be performed in regard to different localities by local pharmacists, have resolved to found a trust for the purpose, to be placed in the hands and at the disposal of the President and Council for the time being of the local Society. This trust is to be called the Sheffield School of Pharmacy Fund. Subscriptions and donations to this fund are to be placed to the separate account of the trust. A statement of receipts and expenditure is to be rendered annually by the Treasurer of the Sheffield Society, or oftener if the Council thinks fit. The trust money is to be employed for the purposes of the Sheffield School of Pharmacy, in payment of rent of rooms, for purchasing apparatus or fittings, or for the payment of lecturers or teachers, but only for such educational purposes and to an extent not exceeding, in one year, three-fourths of the total amount in hand. For the support of this fund donations and subscriptions are to be solicited from any person willing to assist the object for which the Sheffield School of Pharmacy has been established. By this means it is hoped that the school may be made to some extent self-supporting and that for a time, at least, the educational work may be carried on so as to ensure the attendance of students.

This scheme is a most commendable one, and it forms a worthy supplement, as regards the locality it applies to, of the plan adopted by the Council of the Society with the Central School. But at best it can only be looked upon as a means of mitigating the difficulty arising from the absence of an absolute necessity for apprentices to occupy themselves with technical studies. It is only by the realization of the attempt to remove that difficulty that there can be any hope of placing pharmaceutical education on a sound and proper basis throughout the country. Schemes such as that we have referred to as having been started in Sheffield can only be regarded as expedients for lessening the difficulties which now obtain in the adequate maintenance of a school. Lecturers and teachers cannot be expected to continue their labours for the very meagre remuneration now given. The fees paid by students must be con-

siderably raised, and educational training must be considered as a thing of as much value as the goodwill of a profitable business, besides being even more necessary for future success. Such a view, as far as the majority are concerned, can only be the result of the establishment of a compulsory curriculum, and while looking forward to that as the means of effecting material improvement in the position of pharmacists in this country, we would commend to the thoughtful consideration of provincial pharmacists the new project of their Sheffield brethren as one that should be imitated in other localities. We may add that arrangements have this week been made to remove the Sheffield Society to more convenient premises, and that Dr. SORBY, F.R.S., LL.D., an honorary member of the Society, is to lecture to the members on the microscopical structure of iron and steel on the 6th of February next.

On Wednesday next, an Evening Meeting of the Pharmaceutical Society will be held in Edinburgh, at 36, York Place, when papers will be read, entitled: "Suggestion for an Improved Chloroform Liniment," by Mr. Peter Boa; "Extract of Nux Vomica," by Mr. William Duncan; "The American Tinctura Quillaiæ," by Mr. J. Rutherford Hill; and "Recent Additions to the Museum." The chair will be taken at half-past eight o'clock.

* * *

The announcement that the Calendar of the Pharmaceutical Society for the year 1889 is now ready for delivery furnishes a convenient opportunity for referring to some of the points in which it differs from its predecessors. We notice that in addition to the collated precautions required by the Pharmacy Act to be observed in retailing and dispensing poisons there is now included a reprint of the "recommendations" for keeping, dispensing and selling them that were adopted at a general meeting of the Pharmaceutical Society in 1871. Then there are the regulations for the Society's new Research Laboratory, the conditions of competition for the recently instituted Redwood Scholarship and the altered ones for the Jacob Bell Scholarships, as well as particulars as to the modified arrangements for the School of Pharmacy. In addition there are the examination papers set during the previous year, the corrected list of certificates now received in lieu of the Preliminary examination, and the list of subscribers and donors to the Benevolent Fund brought up to date. In the Appendix, which contains a *résumé* of the laws and regulations that affect chemists and druggists especially, will be found the recently issued order allowing a drawback on spirit used in manufacturing pharmaceutical preparations for export, the general order relating to chemists and druggists who hold a licence for the sale of methylated spirit and use methylated spirit in making certain preparations, and the latest alterations in the medical scales for ships, whilst the changes in the law relating to trade marks, consequent upon the passing of the amendment Act last month, will all be found incorporated with the clauses of the principal Act.

* * *

We are glad to notice in a report on another page signs of life in a provincial association that has for a long time been in a somewhat dormant condition. Ten or twelve years ago the Glasgow Chemists and Druggists' Association was a fairly vigorous organization, manifesting considerable interest in all the pharmaceutical questions of the day. We hope that the meeting of the Assistants' Section last week, when Professor Dittmar delivered a lecture on some chemical facts that have recently assumed great importance in pharmacy, will prove to be the first stage in the successful resuscitation of the Society. We understand that the next meeting will take place in the Religious Institution Rooms, 117, Buchanan Street, on Thursday, January 31, at 8.45 p.m., when there will be a lecture on "The Study of Botany," by Mr. Thomas King, Lecturer on Botany, Glasgow and West of Scotland Technical College. All interested in pharmacy are invited to the meetings. It may be useful to add that the Secretary to the Association is Mr. A. Kerr Chalmers, 127, Buchanan Street, Glasgow.

* * *

Recently a paragraph has been going the round of the papers, in which it is narrated how a subprefect residing in the South of France had been poisoned through a prescription ordering a gram of antipyrin having been mis-read as one gram of atropine by the sister of the pharmacist at whose establishment it was presented. According to the *L'Union Pharmaceutique*, however, the mistake was perpetrated in the dispensary of a medical practitioner, and our contemporary takes the opportunity for a homily upon the state of the law in France, which imposes stringent precautions upon the dispensing of poisons by pharmacists and leaves the medical practitioners practically unrestrained, except that they must not keep open shop.

* * *

One of the youngest of our contemporaries, *The Rocky Mountain Druggist*, refers to the climatic conditions in some parts of the Western States of America, as influencing in a curious manner the substances with which the local pharmacists have to deal. So dry is the atmosphere, it is stated, especially in Arizona and New Mexico, and, next to them, Colorado, that if it were not for text-book definitions the term "deliquescence" would not be well understood. Salts that are prone to effloresce are reduced in a short time to powder, and it is rare to see a hard lump of ammonium carbonate.

* * *

The Edinburgh Chemists' Annual Ball took place in the Freemason's Hall, George Street, on the evening of Thursday, January 17, when a very pleasant evening was spent, all the arrangements being carried out most successfully. Much of the success of the evening was due to the able management of Mr. J. P. Thomson, Convener of the Ball Committee.

* * *

The eighteenth Annual Ball of the Midland Counties Chemists' Association was held on Thursday evening, January 17, at the Edgbaston Assembly Rooms, and proved to be in every respect a great success. Over two hundred persons were present.

* * *

At the meeting of the Chemists' Assistants' Association on Thursday next, January 31, a paper will be read on "Photographic Printing and Development," by Mr. H. C. Everson.

Provincial Transactions.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The fifth meeting of the eleventh session was held in the Pharmaceutical Society's House, 36, York Place, on the evening of Wednesday, January 9, at 9.15. Mr. George Coull, President, in the chair.

The minutes of last meeting were read and approved. The evening was then devoted to the reading and discussion of a series of short notes arranged by Mr. William Duncan, Ex-President. The first was a—

Note on the Dispensing and Administration of Sulphonal.

BY PETER BOA.

Some months ago, before sulphonal was so generally obtainable as it now is, an occasional customer got from me some powders containing in each 10 grains of sulphonal. The sulphonal was reduced to very fine powder. A few weeks afterwards he called again and told me that the powders I supplied had produced the desired effect; he had, however, procured some later from the chemist with whom he regularly dealt, and he found that they did not produce any perceptible effect. He had observed that these were in larger particles than the first, and after consultation with his chemist, the powders he had not used were, as he said, "pounded" and returned to him. To his surprise they acted just as well as the first. He wanted to know if I could explain this. I told him that as sulphonal was very insoluble, the more finely it was powdered the better. In fine powder there was so much more surface exposed to the action of the liquid in the stomach, and solution would be facilitated. It was only reasonable to suppose that in proportion to the rapidity of solution so would be the advent of the physiological action. My customer was satisfied with the explanation.

The incident which I have described emphasizes the importance of dispensing insoluble substances in as fine a state of division as possible. I should scarcely think it necessary to refer to this were it not apparent that attention is not always given to the point.

In connection with insoluble substances there is at times a difficulty in getting them conveniently mixed for the patient to take. It may be worth noting that a little spirit and water seems the best vehicle for sulphonal. Any convenient spirit may be used, such as whisky, brandy, or tincture of cardamoms. From a teaspoonful to a tablespoonful, according to the size of the dose of sulphonal, should be put into a wine-glass, and the dose of sulphonal added. The sulphonal sinks, and when water is added and the mixture stirred it diffuses beautifully. With water only it persistently floats.

The next communication was a—

Note on Acetum et Syrupus Scillæ.

BY C. A. MACPHERSON.

In the *Chemist and Druggist* for December 1, 1888, the following appeared:—Scilla is troubled with a mucilaginous separation in his syrup, which he attributes to the use of bruised squill as officially directed, and a consequent overplus of mucilage in the acetum. Has anyone similar experience and what is the remedy?

In reply to this another correspondent wrote in support of the above supposition, but also suggested that in this particular instance the separation might be due to the development of a fungoid growth due to a deficiency in the strength of the acid used.

The flocculent separation is a matter of common observation, though the relative amount will be influenced by the proportion of mucilaginous matter in the bulbs and the length of time that the acetum used has been prepared. It will be more abundant with a recently made acetum than with an older sample, the reason being that the mucilaginous matter is gradually converted into lævulose by the action of the acid. The remedy is thorough filtration both of the vinegar and the syrup. These ought to be pale in colour and perfectly bright. Heat should also be avoided in preparing the syrup. However made any loss by evaporation should be made up by the addition of diluted acetic acid, and not water, as is sometimes advised.

It would be an improvement were the vinegar directed in the Pharmacopœia to be made up with diluted acetic acid, if necessary, till it had a density of 1·038, because the amount of product obtained will vary considerably under different circumstances and consequently be of more varying strength than it need otherwise be.

In the 'Chemists' and Druggists' Diary,' 1886, it is stated that a syrup made at a moderate temperature from acetum scillæ having a specific gravity of 1·04 had a specific gravity of 1·336 only; the B.P. standard being about 1·345. With a view to determine this point an experiment was made. The density of the acetum used was 1·038. Care was taken to prevent loss by evaporation, and this did not exceed 2 grains. The specific gravity of the syrup, which contained a considerable quantity of the flocculent matter and air bells was taken and found to be 1·339; after standing two days it was 1·3425. A portion was then filtered and found to be 1·345. This syrup is too thick, and one with a specific gravity between 1·332 and 1·333 keeps well. Such a syrup can be made by reducing the official quantity of sugar by one-tenth, or by adding 1½ fluid ounces of diluted acetic acid to the present formula.

In Squire's 'Companion' there is a paragraph on the specific gravity of syrups, which seems to have gone through all the editions, in which it is said that syrupus scillæ is directed to weigh 50 ounces, and the specific gravity to be 1·330. This statement, though applicable to the Pharmacopœia of 1864, does not hold good when applied to the editions of 1867 and 1885, and ought to be amended.

Other notes by Mr. Macpherson dealt with the following subjects:—

B.P. Corrections.—In this he pointed out that in the first part of the formulæ for extracts of belladonna (alcoholic), cascara sagrada, gelsemium, jaborandi, rhamnus frangula and rhubarb a "sufficiency" of spirit is ordered to be taken, while in the second part a definite quantity is ordered to be used.

Arsenii Iodidum.—The B.P. states that this salt occurs in small deep-red shining crystalline scales. He had found on applying to wholesale houses in Edinburgh and London that a salt answering to this description could not be had. In every case the article supplied consisted of broken pieces of a crystalline mass.

Donovan's Solution.—This note dealt with published statements as to the acidity and colour of this solution. One gentleman was apparently surprised to find that the solution was acid. The answer to that was that the solution is always acid, and this fact had been known ever since it was first made by Donovan. As to the colour, it had been proved that it should always be of a pale yellow colour with a slight tint of green. Huskisson had shown that by shaking up the solution with a few grains of finely levigated arsenic it was rendered colourless, and this indicated that those who alleged that the solution should be colourless had probably used an excess of arsenic.

Discoloration of Bismuth Salts.—The last note dealt with an objection to the use of brown wrapping paper.

A parcel of bismuth citrate which had been kept for some time wrapped in white paper and with an outer wrapper of brown paper was found to have acquired a brownish tint on the surface, and when made into solution yielded a highly yellow coloured liquid. Similar discoloration had been observed under the same circumstances in other salts.

Owing to the lateness of the hour the remaining notes were held over to a future meeting. The discussion which followed was taken part in by Messrs. Boa, Coull, Duncan, Hill, Lunan, McCurrie, Macpherson and Merson.

On the motion of the Chairman a cordial vote of thanks was awarded to the authors and also to Mr. Duncan.

The meeting then closed.

GLASGOW CHEMISTS' AND DRUGGISTS' ASSOCIATION.

Assistants Section.

The first meeting of the present session of this Association was held in the Chemistry Class Room, Andersons College, East George Street, on the evening of Friday, January 18, at 8·45 p.m.

Professor Dittmar, LL.D., F.R.S., gave the opening lecture, his subject being "Quinine and Quinine Substitutes." Beginning with the discovery of the organic acids by Scheele and the organic bases by Sertürner he gave a most interesting sketch of the progress of organic chemistry, touching upon the prediction of ammonia-like bases by Liebig and their subsequent discovery by Hofmann. He then referred to the attempt of Perkin to make quinine artificially, and his accidental discovery of the aniline dyes. Then the production by Strecker of a body isomeric with quinine. The various speculations and processes by which these results had been obtained were lucidly explained with the aid of diagrams and black-board illustrations showing the relationships between quinoline, quinine and cinchonine. Owing to the lateness of the hour it was impossible to do more than merely refer to the substitutes for quinine, kairine, antipyrin, acetanilid, and phenacetin, but Professor Dittmar expressed his willingness to complete the lecture at some future time.

On the motion of a former pupil, Mr. Boa, of Edinburgh, a vote of thanks was awarded to Professor Dittmar with acclamation.

Mr. A. Kew Chalmers stated that Messrs. Boa and Hill had come as a deputation from Edinburgh, and the meeting would be glad to hear anything they might have to say.

Mr. J. Rutherford Hill said it was a great pleasure to them to be present on this occasion, and he thought it was an honour and a privilege to have listened to so interesting a lecture by one who was so complete a master of this subject as Professor Dittmar. He was highly gratified to find that a determination had been arrived at to resuscitate what was at one time one of the most vigorous and successful associations in the kingdom. He trusted that the Association would be largely supported by the many assistants in Glasgow, and that they would have much success and prosperity in their work.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

A general meeting of this Society was held on Wednesday, Jan. 16, the President, Mr. Learoyd, in the chair, when a paper was given by Mr. Grierson, which was reported in last week's Journal (page 579).

Mr. Ward, in opening the discussion, congratulated Mr. Grierson on his paper, which had been well thought out. He could not, however, agree with the essayist when he said that pharmacists should not look for protection from Pharmacy Acts. The House of Lords added to the Pharmacy Bill brought forward last year that branch shops should be managed only by men who had qualified themselves by examination, showing that, in its opinion, the public should be supplied with drugs through competent channels. He thought that chemists should compete with grocers, etc., in the prices of patent medicines, but the majority of these articles should only be sold to accommodate the public.

Mr. Preston disagreed with the essayist and Mr. Ward in respect to the reduction of prices in patent medicines. The public thought that when they traded with a man who sold $13\frac{1}{2}d.$ articles at $10\frac{1}{2}d.$ that all his goods were reduced in price in the same proportion. But were they? He thought not, and if not then such trading was not honest. From a moral standpoint he opposed such trading, as well as the "get what you can policy," which was sure sooner or later to tell against the seller.

Mr. Newsholme thought that Mr. Grierson's examples of where cutting had paid, could not be applied to traders generally. It might pay one man, but in all probability would not pay his neighbours. He had acted on the principle of Mr. Preston, in upholding the prices of patents, and had no reason to regret so doing.

Mr. J. Watts said that experience taught him that trade goes where patents are reduced, and he advised chemists to go the entire length of reduction and meet their opponents fully.

Mr. R. Watts thought that where a neighbourhood required low prices they should be supplied.

Mr. Haining asked the essayist if chemists should attempt to meet the stores in the prices for dispensing.

Mr. Humphrey said that, as far as pharmacists were concerned, the patent medicine trade was spoilt; therefore it was of no use crying over spilt milk. As regarded any protection Act being brought into force for the benefit of pharmacists, that might be dismissed as an illusion. Free trade in everything was now the cry, and even should there be free trade in poisons the best educated would get the trade. What was wanted at the present time was that educational studies should be applied to daily work, and this would soon lead to increased business.

Mr. Ellinor concurred with Mr. Grierson. Indifference had created the present condition of business. In spite of the patent medicine trade, if a man paid strict attention to business and studied the requirements of the neighbourhood in which he was placed nothing could prevent him attaining success.

The President said that it was impossible to lay down laws to rule all businesses alike. The present condition of business was largely due to the action of their predecessors, who glibly recommended patents, the composition of which they knew not. He also disagreed with the idea of recommending one's own preparations in place of those asked for. For, firstly, how did a man know that so-and-so's pills would not suit so well as his own. Secondly, nineteen out of every twenty customers would then go to some shop where they knew they got what they asked for. The President said he had great pleasure in proposing a vote of thanks to Mr. Grierson for his paper.

This, on being seconded, was heartily carried.

Mr. Grierson briefly replied to the various criticisms and in answer to Mr. Haining's question, said he would charge what he thought he could get.

Previous to the paper being read Mr. Humphrey proposed that Mr. W. A. Shaw be elected a member of the Society, and in doing so, referred to the fact that Mr. Shaw was a student in the Sheffield School of Pharmacy, and had lately been successful in passing the Minor examination.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

On Tuesday night, the fourth monthly meeting of the session was held at the Mason College, under the presidency of Mr. G. E. Perry.

Mr. W. Jones contributed the following paper:—

Moot Points in the Dispensing of Prescriptions.

BY W. JONES.

In the notice calling this meeting, the Secretaries have honoured me by describing the few remarks I am about to make as a "paper," whereas I only promised to open a discussion on the meaning of the sign Oss, whether when such is found in a prescription ℥viij or ℥x should be dispensed.

But though the question itself will not go to the length of an orthodox "paper," you will admit the subject is one of very great importance. I have always understood Oss to mean 10 fluid ounces, though I have many times dispensed 8, and I have on several occasions had mixtures returned with a complaint or an inquiry why the bottle should be larger than when the medicine had been prepared elsewhere.

I think I shall be able to show you presently that the time has arrived when some steps should be taken to induce medical practitioners to discontinue the use of the sign altogether (unless interpreted for its correct value), and to use the sign ℥.

I find in the Weights and Measures Act passed in the year 1835, as follows:—

"In the adoption of the new imperial measure there is no exception made for medicines, as in the case of weights, and the use of any other than the imperial measure is therefore illegal."

Then follows a table showing the Oj to be 20 fluid ounces.

Again, in that excellent little work recently published, viz., "The Art of Dispensing," we read on page thirteen that in 1877 Dr. Redwood gave an authoritative and reasonable explanation of what is to be understood by the various signs for weights and measures, and he says, the terms "C" and "O," congius and octarius, which formerly designated the wine gallon and pint, are now used in the Pharmacopœia to represent the imperial gallon and pint, so that whenever a pint is described therein 20 ounces is clearly intended.

Now, with a view of ascertaining what were the opinions of the medical profession on this question, I wrote to fifty physicians and surgeons in Birmingham the following letter:—

"2 and 3, High Street, Bull Ring,
"Birmingham,
"*January*, 1889.

"Dear Sir,—I should be very much obliged if you would kindly say on enclosed post card whether, if you order in your prescriptions 'aqua ad Oss' you intend 10 ounces or 8 ounces to be dispensed. A great difference of opinion prevails, and I purpose bringing the matter before the Midland Counties Chemists' Association at our next meeting, and I should like to ascertain the views of some of the local practitioners.

"I am, Sir,
"Yours faithfully,
"William Jones.
"*Firm of Morris, Banks and Co.*"

To that I have received thirty-four replies, fourteen in favour of 10 ounces, eleven in favour of 8 ounces, and nine otherwise express themselves.

I think, gentlemen, after the expressions you have heard from practitioners of the highest repute, you will agree with me that it is high time this symbol was either abolished or better understood.

There is another "point" equally unsatisfactory, which I should much like to hear discussed. I mean the absurd system of ordering the sixth or eighth part of a bottle—a sixth part of an eight-ounce bottle, for instance. How on earth does the prescriber calculate his doses? Not only that, but the doses cannot be equal, for we know that generally a medicine bottle will contain a larger proportion at the shoulder than in the middle, and less at the bottom, and I agree with one eminent physician, who has written me a long letter, in which he says:—"He considers that the system of prescribing in the present day is altogether most unsatisfactory and inexact, and he is only surprised that there are not more mistakes, and more deaths as the result."

Now, gentlemen, I think a resolution should be passed by this Association and other kindred societies recommending that medicines should at all times be ordered to be taken by measure-glass, and the number of ounces specified instead of the vague symbol Oss., and that the resolution should be sent to the General Council of Medical Education and Registration of the United Kingdom, with a recommendation that it should be adopted.

There is only one more subject, which it was not my intention to have taken up at all, but that I find that the Secretaries have mentioned it in the notice paper, and that is the "Size of Small Pills."

This matter was well discussed after a paper had been read at the late Conference at Bath, and the general opinion seemed to be that when a very small quantity of an active and powerful drug was prescribed, say a $\frac{1}{20}$ gr. of arsen. acid or $\frac{1}{20}$ gr. of strychnine, they were generally made up into 1 gr. pills, and if the dose of the drug should be more than that, say gr. j., they should be made into 2 gr. pills. There were some who thought a pill should not be smaller than 2 grains, on the ground that they were easier to prepare and much easier to swallow, in which opinion I entirely concur, for the samples produced are exactly 2 grains, and are small enough in all conscience for the most fastidious.

Still if any discussion arises upon this question, with the result that the members of this Association only decide to dispense their pills of one uniform size, some good will be produced, for we know how unpleasant it is for a box of pills to be returned with the inquiry as to whether they are correctly made, as they are not so large as when Mr. So-and-so prepared them. The writer of the paper read at the Conference said that "he was happy to say that, nowadays, in most dispensing houses, it is a rule for the dispenser who first compounds the pills to make a note of the excipient used, and the quantity." But I confess such is not my experience, for I seldom see any note or memorandum at all unless it be the price charged, and that is often a private mark.

A discussion followed.

Mr. Wilfred Southall then read an interesting paper on "Plant Lore."

Proceedings of Societies in London.

CHEMICAL SOCIETY.

A meeting of the Chemical Society was held on Thursday, January 17. Mr. W. Crookes, F.R.S., President, in the chair. A number of certificates were read for the first time, and several persons were duly elected Fellows of the Society.

The following papers were read:—

A Cubical Form of Bismuthous Oxide. By M. M. Pattison Muir and Arthur Hutchinson.—A puce-coloured precipitate is produced by adding excess of potassium cyanide to a boiling solution of bismuth nitrate in dilute nitric acid. Boedeker (*Annalen*, cxxiii., 61) gave the formula $Bi_2O_5 \cdot 2H_2O$ to this substance;

according to C. Hoffmann (*Annalen*, ccxxiii., 110), however, the precipitate is Bi_2S_3, the sulphur being derived from impurity in the cyanide; and one of the authors has described it as an oxycyanide of bismuth (*Proc. Roy. Soc. Edin.*, xi., 557). Further experiments show that the precipitate is a compound of Bi, C, N, and O. When this precipitate, without being washed, is repeatedly treated with boiling concentrated potash solution, 2–3 per cent. of the bismuth in the precipitate goes into solution with practically the whole of the carbon and nitrogen, and tetrahedral crystals of bismuthous oxide remain. It is almost impossible to free these crystals from an adhering film of the puce-coloured compound by treatment with potash; very long-continued action of boiling potash—so concentrated that it solidifies on cooling—does, it is true, remove the last trace of the carbon and nitrogen compound, but the crystals are much corroded by this action. To obtain the cubical form of bismuthous oxide free from the puce-coloured compound, it is better to remove the last traces of this substance by heating for a short time to full redness in air. Cubical bismuthous oxide has the density 8·838 at 25° relatively to water at the same temperature; the relative density of the ordinary rhombic bismuthous oxide is 8·3.

Cupric Iodide, and the Interaction of Iodides with Cupric Salts. By D. J. CARNEGIE, B.A.—By digesting cuprous iodide with iodine and water in a tightly closed bottle at 80° for a few minutes, the author has obtained solutions of cupric iodide containing as much as 0·82 gram per 100 c.c., but has been unable to obtain cupric iodide in the solid state, either from such solutions or by other means. A well-defined basic periodide ($CuI_2 2CuO 4H_2O$) was obtained by digesting copper with barium iodide. The author attempts an explanation of the fact that concentrated solutions of cupric iodide are not obtainable from the interaction of soluble iodides and cupric salts, or of iodhydric acid and cupric hydroxide, in terms of (1) the affinity which iodhydric acid and iodides generally possess for iodine; and (2) the disturbance of equilibrium which the separation of solid iodine causes in a medium which holds cupric iodide in solution. He regards the usual reason given for the non-existence of cupric iodide, viz., its intrinsic instability, as probably inadequate.

Periodates. Part II. By C. W. KIMMINS.—The following salts are described. *Lead Salts.*—The interaction of lead nitrate and $K_4I_2O_9$ or $Na_2H_3IO_6$ results in the production of $Pb_3H_2(IO_6)_2$. When the salt was dissolved in nitric acid, and the solution was concentrated, $Pb_3(IO_5)_2$ was formed. By boiling the first salt with concentrated nitric acid, $Pb(IO_4)_2$ was produced. The salt $Pb_3(IO_5)_2$ is formed by heating $Pb_3H_4(IO_6)_2$ to 275° for four hours. These lead periodates are more or less insoluble in nitric acid; the more insoluble salts are lighter in colour than the others; the more soluble salts show a tendency to take up moisture. *Iron Salts.*—On treating $Na_2H_3IO_6$ or $K_4I_2O_9$ with ferric chloride, a light-brown precipitate was obtained, which on drying at 100° formed a red powder, $FeHI_2O_9$; when this was boiled with nitric acid, the salt $Fe(IO_4)_3$ was produced. The ferrous salt, $Fe_5(IO_6)_2$, was obtained from $Na_2H_3IO_6$, and the salt, FeH_3IO_6, from $K_4I_2O_9$. *Copper Salts.*—The green salt, Cu_2HIO_6, was obtained both from $Na_2H_3IO_6$ and $K_4I_2O_9$. On dissolving this salt in nitric acid and concentrating, a yellow salt was produced, probably $Cu(IO_4)_2$. *Nickel Salts.*—No salt corresponding to HIO_4 could be obtained. The salt $Ni_3(IO_5)_2$ is greenish-yellow, and $Ni_2I_2O_9$ is black and crystalline. *Cadmium Salts.*—The only salt obtained was $CdHIO_5$; it is easily prepared from $Na_2H_3IO_6$, and with difficulty from $K_4I_2O_9$. *Silver Salts.*—The salt $Ag_4I_2O_9$ was formed by treating $K_4I_2O_9$ with silver nitrate; by treating this with nitric acid of different degrees of concentration, other silver periodates are formed. All silver salts yielded orange crystals of $AgIO_4 \cdot H_2O$ when heated with concentrated nitric acid. The salts described in this and a previous paper may be thus classified:—

Meta-periodates. Salts of HIO_4.	Meso-periodates. Salts of H_3IO_5.	Para-periodates. Salts of H_5IO_6.	Di-periodates. Salts of $H_4I_2O_9$.
$AgIO_4 \cdot H_2O$	Ag_2HIO_5	$Na_2H_3IO_6$	$K_4I_2O_9$
$AgIO_4$	$Pb_3(IO_5)_2$	$Na_3H_2IO_6$	$K_3HI_2O_9$
$Pb(IO_4)_2$	$Ni_3(IO_5)_2$	$Ba_5(IO_6)_2$	$Ag_4I_2O_9 \cdot 3H_2O$
$Fe(IO_4)_3$	$CdHIO_5$	$Ag_2H_3IO_6$	$Ag_4I_2O_9 \cdot H_2O$
$Cu(IO_4)_2$		$Ag_3H_2IO_6$	$Ag_4I_2O_9$
		$Pb_3H_4(IO_6)_2$	$FeHI_2O_9$
		$Fe_5(IO_6)_2$	$Ni_2I_2O_9$
		FeH_3IO_6	
		Cu_2HIO_6	

Compounds of Arsenious Oxide with Sulphuric Anhydride. By R. H. ADIE.—This paper describes in detail the preparation of a series of compounds of As_2O_3 and SO_3. The compounds are represented by the formula $As_2O_3 \cdot xSO_3$, where $x=1$, 2, 4 and 8. $As_2O_3 \cdot 8SO_3$ is produced by the interaction of arsenious oxide and sulphuric anhydride. When fuming sulphuric acid is used, approximately $2H_2SO_4 \cdot SO_3$, $As_2O_3 \cdot 4SO_3$, and probably also $As_2O_3 \cdot SO_3$ are formed. $As_2O_3 \cdot 2SO_3$ is obtained by using ordinary concentrated sulphuric acid; and when acids are used approximately corresponding to the formulæ of $9H_2SO_4 \cdot 2H_2O$, $9H_2SO_4 \cdot 4H_2O$, $9H_2SO_4 \cdot 6H_2O$, and $H_2SO_4 \cdot H_2O$, the product has the composition $As_2O_3 \cdot SO_3$. Sulphuric acid of greater dilution than $H_2SO_4 \cdot H_2O$ was found not to yield any compound of As_2O_3 with SO_3. All the compounds described are easily decomposed by moisture, or by heating.

On a Compound of Boric Acid with Sulphuric Anhydride. By R. F. D'ARCY, B.A.—On adding excess of sulphur trioxide to boric acid, and heating the mixture until sulphur trioxide ceases to be evolved, a substance remains which is fairly stable and possesses the composition $BH_3O_3 \cdot 3SO_3$. This formula may be written $B(HSO_4)_3$, but sufficient experiments have not yet been made to determine whether the compound is a sulphate of boron or a compound of boric acid with sulphuric anhydride. In analysing the compound, use was made of Gooch's accurate method of estimating boric acid by distillation with methyl alcohol (*Proc. Am. Acad. of Arts and Sciences*, 1886–1887). Merz and Schultz-Sellack have described compounds of the formulæ $5B_2O_3 \cdot 2SO_3 \cdot 2H_2O$ and $B_2O_3 \cdot 3SO_3 \cdot H_2O$. Attempts to obtain results similar to those obtained by these chemists were unsuccessful. The percentage composition given by the formula of Schultz-Sellack and that given by the formula $H_3BO_3 \cdot 3SO_3$, together with the experimental numbers obtained, are stated in the following table:—

	Schultz-Sellack. $B_2O_3 \cdot H_2O \cdot 3SO_3$.	$H_3BO_3 \cdot 3SO_3$.	Results of analyses.			
			(1)	(2)	(3)	(4)
SO_3 . .	73·2	79·5	78·8	79·7	78·3	80·1
B_2O_3 .	21·2	11·6	11·3	10·6	12·2	11·8
H_2O . .	5·5	8·9	9·9 (by dif.)	9·7 (by dif.)	8·9 (by dif.)	8·1 (by dif.)

Notes of Experiments on Butter Fat. By A. WYNTER BLYTH and G. H. ROBERTSON. The authors have endeavoured to separate the glycerides of butter fat by (*a*) fractional crystallization of the solid portion from

alcohol; (*b*) dissolution in ether and fractional precipitation by alcohol; (*c*) electrolysis. The main result of their experiments is to show that butter fat is composed of solid crystalline fats and an oil. The proportion of the oil to the solid crystalline fats is about 45·5 of butter oil to 54·5 butter crystals. A crystalline glyceride was separated, to which the authors ascribe the formula $C_3H_5\left\{\begin{matrix}C_4H_7O_2.\\C_{16}H_{31}O_2.\\C_{18}H_{34}O_2.\end{matrix}\right.$

They consider that butter is mainly made up of compound and not of simple triglycerides. To the original paper is added a note of the electrical resistance of butter fat and olive oil.

Gawalowski's Method for the Volumetric Estimation of Sulphuric Acid. By BARKER NORTH, Assoc. N.S.S.—In Fresenius' *Zeitschrift für analytische Chemie* for 1888, xxvii., 152-159, is a paper on the "Volumetric Estimation of Combined Sulphuric Acid," by A. Gawalowski. As such a method is still a desideratum among chemists, I undertook, at the request of Professor Thorpe, to make a critical examination of Gawalowski's process. The method consists in adding a quantity of a standard solution of barium chloride, more than sufficient to precipitate the sulphuric acid which may be present, and titrating the excess of barium chloride with a standard solution of sodium carbonate, using phenolphthalein as an indicator of the excess of sodium carbonate. The barium chloride solution was made as nearly seminormal as possible by weighing, and then accurately standardized by gravimetric analysis. The sodium carbonate solution was made seminormal by weighing out recently ignited Na_2CO_3. A series of experiments were made with strict adherence to Gawalowski's instructions. The errors ranged from 2 to 27·5 per cent. It will thus be seen that the method is entirely worthless. The cause of the error doubtless is the solubility of the barium carbonate, which, even in the presence of alcohol, affects the phenolphthalein to such an extent as to render it impossible to properly detect the true end point of the interaction.

Note on the 1 : 3 *homo- and the isomeric hetero-αβ-dichloronapthalenes melting at nearly the same temperature.* By HENRY E. ARMSTRONG and W. P. WYNNE.

The Constitution of Betanaphthol-α-sulphonic Acid (Bayer's Acid). By HENRY E. ARMSTRONG.

The Sulphonation of Naphthalene-β-sulphonic Acid. By HENRY E. ARMSTRONG.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of this Association was held on Thursday, January 17, at 103, Great Russell Street. The Vice-President, Mr. T. A. Ellwood, in the Chair.

The minutes of the previous meeting having been read and confirmed, the evening was devoted to the reading of short papers by members.

The first communication read was a—

NOTE ON AN ABNORMAL FORM OF PARIS QUADRIFOLIA.

BY W. BAXTER, JUNIOR,

Pharmaceutical Chemist.

This singular plant, which is a monocotyledon, is placed in the sub-class dictyogenæ, on account of its leaves having reticulated venation and yet whorled floral envelopes. The sarsaparillas belong to the same class of plants. Some five or six years ago I was fortunate enough to find, in a moist shady wood about three miles from my house, a very rare abnormal form of *Paris quadrifolia.*

As the specific name implies this plant generally has near its summit

Normal	but in specimen referred to
Leaves 4, whorled, net veined, ovate.	6, whorled, net veined, ovate.
From the centre of this whorl rises a green flower on a foot-stalk 2-in. long.	
Sepals 4, lanceolate, green.	5, lanceolate, green.
Petals 4, subulate, green.	4, subulate, green.
Stamens 8 (generally), subulate filaments.	10, subulate filaments.
Styles 4.	4.

There were three plants at the time of my visit to this wood, and I carefully kept their habitat a secret, for they were all of this abnormal type, springing perhaps from the same rhizome. Having taken one of the specimens for myself, taking care, however, not to disturb the rhizome, I watched the other two by paying two or three subsequent visits to them. This was in May, 1883. In May, 1884, I paid an early visit to the plants and found them still safe and sound, but not in flower. In the first week of June of the same year I went again, intending to procure another specimen for a friend, but, alas, some ruthless hand had been there, and the plants were torn up, rhizome and all, and this I had reason to believe by one of the "gentler" sex!

The varieties of this plant seen sometimes are:—(1) those with three leaves, which is very rare indeed, and usually then there is no inflorescence; (2) another with five leaves, the commonest variety of all; and (3) with eight leaves. My specimen has six leaves, and is in addition curious in the number of sepals and petals, and is therefore a very interesting specimen to me. I should be glad, if any of the members of this Association happen to know of any plants (especially if they are of either of the above varieties), if they would provide me with a specimen or two for planting, as I would like to re-instate this plant in my district, which is very favourable for its growth.

It is not destitute of pharmaceutical interest, for our homæopathic fraternity include it in their Pharmacopœia as a remedy used by them for rheumatism, bronchitis and cough.

If the maximum dose of a tincture made from the whole plant is greatly exceeded, poisonous symptoms develope themselves in the shape of convulsions and delirium.

(N.B. This does not refer to the homœopathic dose, but the Russian.)

It is used freely in Russia by physicians for disorder of the brain, and I think the homœopathic supply is drawn from Russian-Asia.

The great botanist, Gesner, once experimented (as was his wont) upon himself by taking ℥j. of a strong decoction in wine, with the result that it prostrated him with profuse perspiration, and exceeding dryness of the throat ensued. Caffeine is an antidote.

The plant is well known to Italians, Dutch, French and Germans, and in Britain, where it is somewhat local (its true home being Nepaul and Russ-Tartary), it is known as one-berry, or true-love.

The Vice-President said that he had met with several specimens of this plant in Huntingdonshire. It appeared to thrive best in a peaty soil. He had frequently met with examples having five or three leaves but not with one having eight. The normal specimens were comparatively common in some places. The indiscriminate destruction of rare specimens like these by ignorant people was much to be deplored.

Mr. A. C. Stark said that he had not been fortunate enough to meet with a specimen of this plant in England, although it was common in Scotland and some parts of Ireland, notably Killarney. He had here a coloured diagram of the normal type. It was one of the few English plants having green petals, and with all due deference to Mr. Baxter's opinion, he

believed that four leaves was the usual number. The medical properties of the plant were said to be narcotic. The word paris he might mention had no reference to the capital of France, but was derived from the Latin *paris*, equal to, referring to the numbers of its leaves, etc., being usually equal.

Mr. J. G. Tingle said he should like to endorse the last speaker's remarks as to four being the usual number of leaves. He had found many specimens of the plant in Northamptonshire.

Mr. Baxter being unavoidably absent there was no reply to the observations made.

The Vice-President then called on Mr. T. S. Dymond to exhibit some apparatus employed in the Research Laboratory with explanatory notes upon them.

Chemical Apparatus.

Mr. T. S. Dymond first drew attention to the Bunte Burette, comparing it with the nitrometer and pointing out the advantage of using mercury over a solution of common salt. The estimation of a solution of sodium nitrite was performed, and it was recommended that the potassium iodide be mixed with the sulphuric acid, previously to running into the burette.

An apparatus for filtration under reduced pressure was next exhibited. A perforated porcelain disc, 1½ inches in diameter, was fitted into a filter funnel, and on it were placed two filter papers, the lower one the same size as the disc, the upper one projecting ⅛ inch beyond it. The funnel was now fitted into a Woulff's bottle, or better, into a belljar resting on an india-rubber pad, on which stood a vessel for receiving the filtered liquid. This is connected with a vacuum pump. Such a pump could be easily constructed of a glass T piece, into one limb of which a capillary tube is inserted as far as a constriction in the other limb. Such a pump may be used with either a head or a fall of water, a reduced pressure being obtained equal to 28 or 30 inches of mercury.

In the discussion upon these—

Mr. Blackham said he had not seen the method of filtration exhibited by Mr. Dymond before, but it seemed to him in every way excellent. Samples of iodide of potassium containing carbonate were by no means common.

Mr. J. Ince said they were much indebted to Mr. Dymond for describing this new method of filtration, which was most useful to the practical pharmacist. As to the method of filtration by decreased pressure in a partial vacuum it was indispensable, and he almost wondered how pharmacists had dispensed with it so long. This method was now applied to percolation, and yielded results in every way most satisfactory. He hoped before long it would be universal; the waste of time in percolation and filtration had been enormous, but this method would do very much to lessen it.

Mr. Williams described a process for producing a partial vacuum for filtration purposes, depending on the condensation of steam.

Mr. Bird said one great feature of this new method of filtration was that it obviated the danger of breaking the filter paper, a catastrophe which gave much trouble and annoyance.

Mr. Richards remarked that it was difficult to get good filter papers of uniform quality, and few would stand much pressure, but these difficulties would be overcome by the system of filtration shown.

The Vice-President said that the large reservoir to the burette exhibited by Mr. Dymond was a decided improvement, avoiding the up and down motion so inconvenient in the old form, and also preventing overflowing. He would recommend that double the quantity of the reagents for estimation be employed and half be run in; this would prevent leakage. Sp. æther nit. frequently gave off as much NO with potas. iodid., as it did when the acid was added, and he thought it better therefore to add them separately. The filtration method exhibited was admirable.

Mr. Dymond remarked that one of the objects in mixing the H_2SO_4 and KI before adding to the nitrometer was to prove the presence or absence of nitrous compounds in the acid used.

The next paper read was—

Note on the Presence of Oxalic Acid in the Residue from Sp. Ætheris Nitrosi.

by A. campbell stark.

Pharmaceutical Chemist.

Some time ago my attention was called to a statement (in a non-technical paper) to the effect that the residue left in distilling spirit of nitrous ether frequently contained large quantities of oxalic acid. Although this is not a very surprising statement, indeed, it is, I believe, mentioned in many text books, still it seemed to me worthy of confirmation. I, therefore, prepared a quantity of spirit of nitrous ether, but by the B.P. process, and examined the residue for oxalic acid in the following manner. The residue was diluted with water and H_2S passed through until precipitation was complete. It was then filtered, boiled, and precipitated completely with $BaCl_2$; the barium precipitate was collected, and treated with acetic acid; on treating the acetic filtrate with $CaCl_2$ a precipitate of oxalate of calcium was produced after some time.

It is not difficult to account for the formation of oxalic acid in such a residue as that left in distilling spirit of nitrous ether. A constant product of the action of nitric acid on alcohol is hydroxyacetic acid, this on further oxidation yielding oxalic acid. The reaction probably takes place in the manner indicated by the following two equations:—

1. $2CH_3(CH_2OH) + 6HNO_3 = 2CH_2OHCOOH + 6HNO_2 + 2H_2O.$

(Glycollic acid).

2. $2(CH_2OHCOOH) + 2O_2 = \left\{\begin{matrix}COOH\\COOH\end{matrix}\right\} + H_2O.$

Oxalic acid.

The actual oxidation of the glycollic acid to oxalic acid probably takes place after the final addition of nitric acid as ordered in the Pharmacopœia.

Such a to-be-expected discovery as this, although of course interesting, is only useful for its suggestive value. The question arises, does spirit of nitrous ether, among the "other substances" mentioned in the B.P., contain oxalate of ethyl? This is a question of some importance, and I hope to be able to lay the answer to it before you at a future date.

The Vice-President having invited discussion,

Mr. T. S. Dymond said Mr. Stark's paper hardly needed criticism or discussion; still he could not help being struck with the immense number of compounds that sweet spirit of nitre contained, or yielded in its manufacture. It was impossible to see what really went on in the process, and what the finished product consisted of. Mr. Bird had recently found CO_2 as a product of the reaction which took place in the process of manufacture, due no doubt to the oxidation of the carbon at the expense of the nitrogen. It seemed to him that all these discoveries showed the necessity of the employment in medicine of substance of known and definite composition.

The Vice-President, after a reference to the many spurious adulterated foreign drugs and chemicals in the market, said that this paper helped to show how absurd was the tendency to attempt to express every reaction by one equation. No doubt in making sp. æther nit. the reaction expressed by the equation usually written for it did take place, but it was no

means to be regarded as the last word on the matter, and he fully agreed with Mr. Dymond as to the necessity of the employment of definite chemical substances.

Mr. Stark then exhibited some crystals which had deposited from a strong acid solution of quinine kept in a very cold place. The crystals were hard, transparent and lustrous, and about the size of those usually seen of oxalic acid. They were very soluble in water, yielding a strongly acid solution. The quinine used was, he believed, up to the B. P. standard of purity. He had not yet had time to examine them properly, but would suggest that they were those of the acid sulphate containing two molecules of H_2SO_4 and seven of H_2O to one of quinine.

Mr. F. A. Rogers then read some short notes on "First Aids to the Wounded," and gave some illustrations of bandaging, etc.

The next communication read was a paper on—

Recent Analyses of Hydrogen Peroxide.

BY T. A. ELLWOOD, A.I.C., F.C.S.

A short time before Christmas, an instance was brought under my notice of the rather erratic behaviour of peroxide of hydrogen when applied as a hair-wash, it having been supplied as "Mr. So and So's Golden Hairwash," and warranted to produce certain effects, the label being much the same, in its extravagant language, as it is customary to place upon such preparations.

Of course one of the effects it was guaranteed to produce was to make dark hair lighter in colour. I need not say that the purchaser of a little of this "Renowned Preparation" was one of the fair sex, who applied the wash strictly in accordance with "directions enclosed in wrapper," when to her chagrin, after a few days regular application, it not only made the hair lighter, as she had anticipated, but actually turned it quite white; and as she was not on the "wrong side of seventy," her consternation was great, and she at once, in not a little rage, repairs to Mr. Chemist and Druggist to pour a vocabulary of unpleasant words into his ears. But, alas! What could he do but explain his surprise and sympathy, without in the least altering the case or mitigating the results? She doubtless thought that a little help would have proved worth a lot of pity just then.

I am unable to account for this action of the peroxide, but am inclined to lay the blame upon the state of the hair, rather than the chemical.

The circumstances, however, led me to conduct a few analyses of the various commercial samples of peroxide of hydrogen, which I will now give you.

I obtained a sample from each of ten different retail sources, some of which had probably been stocked a long time, but, nevertheless, they were the articles sold by the retailer when asked for peroxide of hydrogen, and hence if not of the quality asked for, ought to be replaced by a more reliable preparation.

The commercial method of preparing peroxide still being chiefly by the action of sulphuric acid on hydrated barium peroxide, it is not to be wondered at if it contains traces of the sulphate radicle. I found that not merely traces, but *six* of these samples contained sulphuric acid in rather large proportions, whilst *two* others contained hydrochloric acid, probably owing to the use of this acid in the preparation from barium peroxide.

The samples examined were *five* sold as 20 volume, and five as 10 volume solutions. Twenty volumes seem rather more than we ought reasonably to expect in aqueous solution, especially if it is to be kept in stock, and frequently opened for use, and hence you will not suppose that these gave good analytical results. A 10 volume solution would prove far more satisfactory to all parties.

Several of the numerous methods of estimating the amount of available oxygen contained in the solution were employed; but the differences in the results obtained by them were so slight that, from a pharmacist's point of view, it may be inferred that it is immaterial which method is used.

Perhaps the method most ready at hand is by means of permanganate of potassium, using a decinormal solution and titrating into an acid solution of the peroxide. It is customary in this method to acidify with sulphuric acid; but I have found that it may be quicker manipulated by using nitric acid, which does not affect the solutions injuriously in any way, and at the same time causes the oxygen to be quickly evolved.

$2KMnO_4$ with the acid and peroxide evolve $5O_2$, one-half of which is from the hydrogen peroxide and the other half from the permanganate, the titrating being complete as soon as the solution begins to acquire a permanent colour. From this reaction it is easy to estimate the amount of oxygen in the peroxide.

Two of the solutions I found would liberate iodine from potassium iodide in an alkaline solution, and hence I suspected traces of ozone to be present. This I think was found to be the case by taking a little in a sealed tube and heating for a short time in a water-bath, which temperature would decompose the hydrogen peroxide, but not the ozone.

After this treatment I found that iodine was still liberated, which I estimated with a centinormal thiosulphate of sodium solution, and from the result calculated the amount of ozone originally present.

I have tabulated the results obtained from each of the ten samples analysed:—

Sample.	Supposed strength in volumes.	Actual strength in volumes.	Percentage of H_2SO_4 present.	Percentage of HCl present.	Ozone.
1 .	20	14	none	1·2	traces
2 .	,,	11	,,	·5	none
3 .	,,	9	·2	none	,,
4 .	,,	6	none	,,	,,
5 .	,,	10	1·8	,,	traces
6 .	10	3	2·	,,	none
7 .	,,	9	none	,,	,,
8 .	,,	5	·8	,,	,,
9 .	,,	10·5	1·4	,,	,,
10 .	,,	2·3	·9	,,	,,

Out of the ten samples, then, I found but one (No. 4) that could be considered chemically pure, and this was less than one-third the strength it was supposed to be. Whether the presence of impurities in the peroxide is of significance depends upon the use to which it is to be applied; as a hairwash, probably it is immaterial, but nevertheless it is always an advantage to have everything in a pharmacist's establishment pure, or of the best quality obtainable.

An ingenious and quick method for roughly estimating the value of hydrogen peroxide appeared in the Chemical Society's Journal a short time since. It is for the direct volumetric estimation of the amount of available oxygen, and is performed as follows:—

Into a graduated tube closed at one end is poured a small but definite quantity of the peroxide solution under examination, this having been previously neutralized with ammonia; then are added a few grains of potassium permanganate, wrapped in tissue paper to prevent immediate reaction. The open end of the tube is then closed with the finger, and the whole is agitated so as to break the paper and cause the reaction between the peroxide and permanganate. It is then opened

under water, and the difference in volume before and after agitation is noted, which equals the amount of oxygen evolved.

The same can also be more accurately performed by use of the nitrometer.

This will enable a quick determination of the value of hydrogen peroxide, and thus the retailer may easily ascertain whether or not he is selling a reliable preparation.

At the conclusion of the paper—

Mr. A. C. Stark said that he believed the erratic action of H_2O_2 was in most cases due to the state of the hair; on some kinds of hair it appeared to have no action at all. He had found the method of estimation by a nitrometer to give excellent results.

Mr. Blackham asked if it was necessary to acidulate the solution, when it was already acid from the presence of H_2SO_4. He had found nitrohydrochloric acid to give the best results.

Mr. Williams asked if chlorine was present in the sample mentioned as having turned the hair white.

Mr. Richards said that a great deal of peroxide of hydrogen was imported from abroad at an absurdly low price, and of dubious quality. He did not think it possible to get a reliable preparation over the strength of 10 volumes, but it was often advertised as containing as much as 32 volumes. A large quantity was sold in East London for bleaching hair, and as ammonia was generally purchased at the same time, it would be interesting to know if this was used for neutralizing any free acid.

Mr. Bird said this was a preparation which should be analysed from time to time to ascertain its strength; he had sometimes found samples containing less than 1 volume.

Mr. Ellwood, in reply, said it was probable that an acid solution was found to keep better, but if so the fact that the solution was acid should be made known when sold. One sample, containing most acid, was found to contain least H_2O_2, *i.e.*, ·2 per cent. H_2SO_4 to 3 vols. H_2O_2. The sample referred to as turning the hair white did not contain chlorine, but ·2 per cent. H_2SO_4 and 9 vols. H_2O_2, instead of 20. He had not tried the utility of neutralization with ammonia. In conclusion, he would suggest that this preparation should not be sold of more than 10 vols. strength, and should be frequently estimated.

The proceedings then terminated.

Parliamentary and Law Proceedings.

Important Decision under the Irish Pharmacy Act.

On Thursday, January 17, in the Queen's Bench Division, before Lord Chief Justice Morris, Mr. Justice O'Brien, Mr. Justice Holmes and Mr. Justice Gibson, a case of considerable importance to compounders of medicine in Ireland came on for hearing. It was a case stated by the magistrates sitting at Petty Sessions in Ballybay, county Monaghan. It appeared that Mr. Arthur Fee, of Ballybay, who was described as "a druggist and chemist" who carried on business in an establishment called a "medical hall," was summoned by the Pharmaceutical Society of Ireland for having, on June 16, 1888, kept an open shop for retailing, dispensing, and compounding medical prescriptions, and did compound a prescription for one John Murray, contrary to the provisions of the Pharmacy Act passed in 1875, he not being qualified under the Act. Murray got a prescription from Mr. Robert Armstrong, of Cootehill, a pharmaceutical chemist, and took it to Mr. Fee to make it up, which Mr. Fee did, and handed him the medicine.

Mr. Ferrall, Registrar of the Pharmaceutical Society, proved that Mr. Fee was not on the register of pharmaceutical chemists, and that this was the only register under the Act.

On the part of the defendant, it was contended that, in addition to a register for "pharmaceutical chemists," there should also be a register for "chemists and druggists," and on this ground the magistrates dismissed the summons against Mr. Fee, with costs.

The Lord Chief Justice delivered the judgment of the Court, holding that Mr. Fee had not complied with the provisions of the Act, and that there was no necessity for keeping a register for chemists and druggists. They therefore should hold that the magistrates should have convicted in the case, but they would not give costs against Mr. Fee.

Mr. Wylie, who (instructed by Messrs. Scallan and Co.) appeared for Mr. Fee, said that there was a Bill before Parliament, and it had reached its third reading, to enable chemists and druggists to compound medicines.

Mr. Wilson, who (instructed by Messrs. Casey and Clay) appeared for the Society, said he was instructed that this Bill was withdrawn.—*Dublin Evening Telegraph.*

Poisoning by Opium.

Dr. Whyte, City Coroner, held an inquest on the 11th inst., at the wholesale drug establishment of Mr. Hugh Moore, Linen Hall, Bolton Street, on the body of an employé named Thomas Dormer, who died on Wednesday afternoon from the effects of poisoning.

Mrs. Adelaide Dormer, the wife of deceased, deposed that she resided in the establishment with her husband, who was 52 years of age. He came from his work on Tuesday and dined as usual. She went out shortly after dinner, and on returning at 5.30 p.m. she found him sitting by the fire. He retired to his room about 10 o'clock, and at 3 o'clock in the morning she found he was sleeping heavily. He was still sleeping at 8 o'clock. She could not rouse him, and sent for Dr. Lyon, of Bolton Street, who applied the stomach pump, but without avail. The deceased died at 4 o'clock on Wednesday evening.

John Dormer, son of the deceased, deposed that he saw his father with a jam pot (produced) in his hand after he retired to bed.

Dr. R. N. Lyon deposed that he was called in at about 10 o'clock on Wednesday, and found the deceased suffering from symptoms of narcotic poisoning. He was in a comatose condition. Witness used the stomach pump and did everything in his power to restore him, but without effect. He took a pint of very dark fluid from his stomach, which he sent to Professor Tichborne.

Charles R. C. Tichborne, F.C.S., Professor of Chemistry, Carmichael College, stated that he made an examination of the fluid, and also a cup, in which there were traces of a liquid, and he found that the contents of the cup was laudanam, and there were indications of morphia in the fluid taken from the stomach. Both morphia and meconic acid were recognized in the contents of the stomach, therefore the poison present was some preparation of opium. The amount of impure alkaloids obtained from the stomach was 3·35 grains, equal to about 1 ounce and $\frac{1}{10}$ of laudanum. The urine taken from the bladder after death yielded traces of morphia, although there is no evidence of the patient having been seen to drink it.

Martin Murray stated he had a conversation with the deceased on Tuesday night. He told him to ask his father to pay a debt, which he owed Mr.

Magee, of Bolton Street. He put out his hand and said "Good-bye; you will see me no more alive." He appeared to be under the influence of drink.

Mr. W. F. M'Neight, one of the firm, stated that the deceased had been formerly a groom and coachman. He had great experience with horses, and was skilful in his treatment of them when sick, and consequently had access to drugs.

A verdict was returned that the deceased died from the effects of a dose of opium, whilst of unsound mind.—*Dublin Daily Express.*

The Sale of Beef Wine.

On Wednesday, at the Smethwick Police Court, Gilbert Thonger, chemist, of Harborne, was charged at the instance of the Inland Revenue authorities with selling on the 29th of August, a pint bottle of a mixture of foreign wine and other substances, described as "Pearson's Liebig's Beef Wine," without having a licence.

Mr. J. T. Squires appeared to support the prosecution on behalf of the Somerset House authorities, and Mr. W. Shakespeare defended.

William Collier, an officer of Inland Revenue at Harborne, deposed that on August 29 he visited defendant's shop and purchased a bottle of mixture produced for which he paid 2*s.* 9*d.* It was labelled "Pearson's Liebig's Beef Wine." On September 23 he sent it to Somerset House for analysis, where it appeared to be port with meat and malt extracts added. It was palatable as a beverage.

Mr. Acton, of Somerset House, who proved this, said, in cross-examination, that he was in a case the Excise had had at Cardiff against this wine, and the magistrates dismissed it. The Court of Appeal upheld the decision, but witness added that it was not precisely the same kind of wine.

Mr. Shakespeare for the defence contended that under the Act of 16 George II., chap. 8, provision was made whereby if the mixture was given by physicians, apothecaries, surgeons, or chemists, and administered to sick persons exemption could be claimed.

Mr. Calthorpe: Then the question is whether it is a medicine or not?

Mr. Shakespeare: Yes.

Edward Davis, chemist, said he had examined a bottle of the mixture.

Mr. Squires: Have you examined this one?

Witness: No.

Mr. Squires: Then I object to your evidence, as we admit that some of the mixture sold is all right.

Mr. Shakespeare remarked that was an important admission, and added that he should prove that this bottle contained the same as all the others.

Witness, continuing, said the bottle he examined contained port wine, extract of beef, and extract of malt.

Thomas E. Hill, B.M., also gave evidence that the mixture contained nearly 30 per cent. of proof spirit. In his opinion it would be very valuable as a restorative, and a medicine.

David Pearson, of Liverpool, the manufacturer of the mixture, said they put the juice of 5lb. of beef to the quart, and there was 2oz. of malt extract. Sometimes they put quinine, but not in all cases, as medical men would not always order this. They made about 200 gallons of the mixture at a time, and it was prescribed by at least 5,000 medical men as a medicine. The bottle Mr. Davis examined contained exactly the same as that now produced. They had had a lot of mixture returned, because there was not sufficient wine in to preserve it.

The Bench fined defendant £5 and costs.—*Birmingham Daily Mail.*

An Act for Regulating the Sale and Use of Poisons, Queensland, 1888.

The following Act has recently been passed by the Queensland legislature:—

Preamble.—Whereas it is expedient for the safety of the public to regulate the sale of poisons, and to make provision for the exercise of proper precautions in the use of the same. Be it therefore enacted by the Queen's Most Excellent Majesty, by and with the advice and consent of the Legislative Council and Legislative Assembly of Queensland in this present Parliament assembled, and by the authority of the same, as follows:—

Short Title.—1. This Act may be cited as "The Sale and Use of Poisons Act, 1888," and shall commence and take effect on the first day of January, one thousand eight hundred and eighty-nine.

On the Sale of Poisons Specified in the First Part of Schedule 1. *Entry to be made.*—2. Every person who shall sell any poison specified in the first part of the First Schedule to this Act shall, before the delivery thereof to the purchaser, inquire his name, place of abode, and occupation, and the purpose for which such poison is required or stated to be required, and shall thereupon make a faithful entry of such sale, specifying the poison and the quantity thereof, and all such particulars so given by the purchaser, together with the day of the month and year of such sale, in a book to be kept by the vendor for that purpose, in the form set forth in the Second Schedule hereto; and every such entry shall be signed by the person making the same, and also by the purchaser, unless he shall declare himself unable to write (in which case the person making the entry shall add thereunto the words "Purchaser cannot write"), and whenever a witness to the sale is required by this Act such entry shall be signed by such witness, together with his place of abode. When sales and purchases of poisons are made by correspondence, the letter ordering the same shall be preserved by the vendor, and a memorandum of the date of the said letter, by whom it was written, and the quantity and particulars of the poison therein ordered, shall be entered in the said book, and if the poison be transmitted by post the letter or package containing the same shall be registered; and no person shall sell poison so ordered to any person with whose signature he is not acquainted, unless such signature shall have been witnessed by a justice of the peace or clergyman, or be authenticated by some person known to the vendor.

Restrictions as to Sale of Certain Poisons.—3. No person shall sell any poison specified in the first part of the said First Schedule to any person who is under the age of eighteen years, or who is unknown to the vendor unless the sale be made in the presence of some witness who is known to the vendor, and to whom the purchaser is known, and which witness signs his name, together with his place of abode, to the required entry before the delivery of the poison to the purchaser.

Certain Sales to Householders only.—4. It shall not be lawful to buy or sell any poison for the avowed purpose of destroying rats or other vermin infesting houses and premises, unless the purchaser be a householder.

Arsenic and Strychnine must be Coloured.—5. No person shall sell any arsenic or strychnine, or any preparation of the same respectively, unless in the case of arsenic, and any uncoloured preparation of the same, such poison shall be mixed before the sale, or delivery thereof, with soot or other black substance, in the proportion of one ounce of soot or other black substance at least, to one pound of arsenic, and so on in proportion for any greater or less quantity. And unless in the case of strychnine, or any uncoloured preparation of the same, such poison shall be coloured with

Armenian bole or other red colouring matter before sale or delivery thereof. Provided always that whenever the purchaser states that such arsenic, or strychnine, or any preparation thereof, respectively, is required not for any pastoral or agricultural use or for the destruction of vermin, but for some purpose for which such other admixture would, according to the representation of the purchaser, render it unfit, such poison may be sold without the admixture hereinbefore specified.

Certain Sales Excepted from Act.—6. This Act shall not extend to the sale of any poison when made up or compounded in any medicine according to the prescription of a legally qualified medical practitioner, or in the form of homœopathic medicine, unless of a greater strength than the third decimal potency, nor to the sale of patent or proprietary medicines, nor to the sale of photographic materials for the purpose of photography; nor to the sale of medicines dispensed by a veterinary surgeon for animals under his treatment; nor shall it extend to any sales by wholesale dealers in the ordinary course of wholesale dealing, if an order in writing, signed by such purchaser, shall be given for the supply of the same. Provided that all such sales shall be entered in a book, and that the bottle or other vessel, wrapper or cover, box or case, immediately containing the poison be labelled, as required by this Act.

What Articles Deemed Poison.—7. The several articles mentioned in the said First Schedule shall be deemed poisonous within the meaning of this Act; and on the recommendation of the Board of Pharmacy, the Governor-in-Council may, by proclamation duly published in the *Government Gazette*, from time to time declare that any other article specified in such proclamation shall be deemed a poison within the meaning of this Act.

Unqualified Persons not Allowed to Sell Poisons.—8. Every person, other than a legally qualified medical practitioner, or a registered pharmaceutical chemist, who shall sell any poison shall, unless he hold a certificate from the Board of Pharmacy that he is a fit and proper person to sell poisons, be liable to a penalty not exceeding twenty pounds.

Dealers in Poisons.—9. Any person who shall produce a certificate from a legally qualified medical practitioner or a police or a stipendiary magistrate that he is a fit and proper person to be allowed to sell poisons shall receive from the Board of Pharmacy a certificate as a dealer in poisons on payment of a fee of ten shillings per annum to such Board of Pharmacy. Every such dealer in poisons shall keep all poisons in a cupboard of sufficient dimensions, and containing such shelves as the Board of Pharmacy may direct. The word "Poisons" shall be conspicuously painted or written on such cupboard, and no articles other than such poisons shall be kept or placed therein.

How Vessels or Wrappers to be Marked.—10. No person shall sell any poison, either by wholesale or retail, unless the bottle or other vessel, wrapper or cover, box or case, immediately containing the same bears printed thereon the name and address of the seller thereof, and also the word "Poison" printed conspicuously in red letters.

Poisons to be Labelled.—11. No owner or other person whatsoever in charge or possession of any poison shall keep it in any place (whether the same be ordinarily accessible to others or not) unless the bottle or package of whatever kind in which such poison may be contained shall be marked as "Poison," and be otherwise duly labelled in the manner provided by section 10.

Offences.—12. Any person who shall—

(1) Sell any poison contrary to the provisions of this Act; or

(2) Deliver any poison without having made and signed the entry required by this Act on any sale thereof, or without having obtained such signature to such entry as is required by this Act; or

(3) On purchasing any poison give false information in answer to inquiries to the person selling the same in relation to the particulars which he is by this Act authorised to inquire into of such purchaser; or

(4) Sign his name as a witness to the sale of any poison to a person unknown to such witness; or

(5) Fail to comply with any other of the provisions of this Act;

shall for every such offence, upon summary conviction thereof before two justices of the peace, be liable to a penalty not exceeding £20.

The Governor-in-Council may make Regulations.—13. The Governor-in-Council may from time to time make regulations for carrying into effect the objects of this Act. Such regulations, after publication in the *Government Gazette*, shall have the same force and validity as if they formed part of this Act; and a copy of the same shall be laid before both Houses of Parliament.

Governor-in-Council may Direct Cancellation or Certificates.—14. The Governor-in-Council may direct the cancellation of the certificates as a dealer in poisons held by any person who is convicted of any offence against this Act, which renders him unfit, or who may be deemed unfit through habitual intoxication, or otherwise, to continue to sell poisons.

Schedules.

Schedule 1.—*List of Poisons. First Part.*

Arsenic, its compounds and preparations containing same.
Cyanide of potassium and preparations of cyanides of potassium.
Prussic acid and preparations containing same.
Strychnine, its salts and preparations containing same.
Savin and its oil preparations of same.
Ergot of rye and its preparations.
Chloral hydrate and its preparations.
Corrosive sublimate and preparations containing same.
All poisonous vegetable alkaloids and their salts and preparations containing same.
Aconite and preparations of same.
Atropine and preparations containing same.
Phosphorus.
Nux vomica and its preparations.
Oxalic acid.
Chloroform.
Belladonna and preparations containing same.

Second Part.

All oxalates.
Opium.
Essential oil of almonds, unless deprived of its prussic acid.
Nitric acid or aquafortis.
Sulphuric acid or oil of vitriol.
Carbolic acid.
Hydrochloric acid or spirits of salt.
Oxides of mercury.
Sulphate of zinc.
Sulphate of copper.
Sugar of lead and preparations.
Calabar bean.
Cannabis indica.
Conium.
Croton oil.
Lobelia.
Nitro-benzine.

Schedule 2.—*Form of Entry in Book on Sale of Poisons.*

Review.

THE ANALYST'S LABORATORY COMPANION. By ALFRED E. JOHNSON, Ass. R.C.Sc.I., F.I.C., F.C.S.*

This is a compilation of tables of factors, etc., to facilitate calculations in analysis, resembling in its general features some previously noticed, but differing from them in the inclusion of logarithms (tables of which for numbers from 1 to 1000 are given to seven figures), and in a few other particulars. Besides these tables there are some useful notes on the indicators used in volumetric analysis, and their applicability, on the use of logarithms, and on one or two special processes of analysis.

The tables as a rule are such as an analyst is constantly needing to refer to, and will be found to save a great deal of labour in calculations; but as we have previously remarked in noticing a similar set of tables, some of them, such as the elaborate tables for conversion of the different thermometric scales, seem superfluous, as most people would mentally perform the slight calculation required in much less time than it would take to find the table and look it up.

The selection of tables seems fairly comprehensive, but of course the needs of an analyst will vary greatly according to the general style of his practice, and the author has wisely interleaved the book with blank pages, so that each may insert any tables or memoranda not already included.

A hitherto unpublished method for estimating the amount of chicory in coffee (by Mr. E. W. T. Jones, F.I.C., F.C.S.) is recommended by the author as thoroughly reliable and trustworthy. It consists in estimating the amount extracted by boiling water. Coffee is stated to give a remarkably constant percentage extract of 24, while chicory gives a mean percentage of 70. On this basis a table is compiled giving the percentage of chicory corresponding to any percentage of extractive between these limits. This is very simple, but we should scarcely like to trust entirely to this method without an estimation of caffeine, especially in view of the fact that artificial coffee berries are said to be now largely manufactured from roasted meal.

The book is of very convenient size, and the tables well arranged so as to be easily and quickly found and consulted, and any analyst who uses it will find a great deal of time and labour saved to him.

* London: J. and A. Churchill. 1888. Crown 8vo. Pp. i.-viii., 1-92.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

STANDARDIZED PREPARATIONS.

Sir,—Having been interested for several years in the subject of standardized preparations, I was much pleased to see a paper on the subject by Mr. Ransom in a recent issue.

I should like to be allowed to express my concurrence in the statements and arguments made by Mr. Ransom, and at the same time to emphasize one or two points brought out during the discussion which followed the reading of the paper.

The discussion seems to have been chiefly directed towards the advisability of standardizing the crude drugs, or their preparations.

In my opinion, there are several reasons for preferring a preparation which has been standardized after manufacture rather than one made from a standard drug.

In the first place, as brought forward by Mr. Ransom, there is considerably greater difficulty in most cases in performing an accurate assay of the root or bark than of an alcoholic extract or tincture.

Secondly, after a root or bark has been satisfactorily estimated, I fail to see the value of the estimation, unless we can ensure perfect exhaustion of the drug by the menstruum used in the preparation.

Again, some drugs are liable to be attacked by mites and other insects, with consequent alteration in the quantity of the active principle, especially when kept in powder, a necessary condition in the case of standardized drugs.

If, then, standardization of crude drugs is not satisfactory, the question arises, what is the best preparation to make, in order to retain the active principles most effectually. I strongly recommend the suggestion offered by Mr. Short, viz., that a strong tincture, made by repercolation, is the best form in the great majority of instances. There must be, however, a limit to the strength of these tinctures, and this limit should not be too high. Tinctures made of the same strength as is now generally recognized for fluid extracts (1 oz. in 1 fl. oz.) being in most cases far too strong; a deposition of some of the proximate principles almost invariably occurs; sometimes indeed the most active constituents are slowly precipitated. In my opinion the most convenient strength varies from five ounces to ten ounces of drug in the pint of strong tincture. The objections to the use of standardized extracts as a starting point for other preparations has been mentioned by Mr. Ransom, so I need say nothing more on this subject.

Another point of great importance was indicated by Mr. Short when he said he was afraid all the ingredients in a drug were not sufficiently considered in attempting to obtain a standard preparation. In order to thoroughly represent the drugs experimental evidence is required as to the strength of spirit necessary for each individual strong tincture, allowance being made for the moisture in the drug.

The adoption of such strong tinctures, requiring simple dilution to prepare the ordinary tinctures, would form a complete answer to Mr. Martin, who spoke of "torturing the drug by a long and elaborate process."

Commenting upon the official cherry laurel water, Mr. Ransom says "it deserves mention, if only as suggesting another method of obtaining the desired result." In the case in point, and perhaps in that of tinct. prun. virgin., this method of strengthening a preparation (viz., by adding the active principle) is quite satisfactory, as the hydrocyanic acid undoubtedly exists in the free state in these preparations; but the case is entirely different with tinctures, etc., of drugs containing alkaloids or glucosides, these principles being usually combined with some peculiar plant constituent, and it could be laid down as an absolute rule that in standardized preparations no active principle or portion of the active principle should have its natural combinations disturbed.

R. A. CRIPPS.

Pax.—The 16th section of the Pharmacy Act provides that nothing in the preceding sections (relating to registration) shall extend to or interfere with the making or dealing in patent medicines, or with the business of wholesale dealers in supplying poisons and the ordinary course of wholesale dealing.

American.—We believe that the practice of pharmacy in Ohio is restricted to registered persons and persons acting under their supervision, and that registration is dependent upon passing an examination, preceded by four years' practical experience.

M. N. W.—We believe that such diagrams are published by Van Voorst, Chapman and Hall and Johnston.

Mr. W. G. Taplin.—Your communication has been received, and shall be attended to.

Pharmaceuticus.—The third reprint of the British Pharmacopœia is practically the same as the second, the only alterations being the introduction "Paregoric," "Paregoric Elixir" and "Laudanum" as synonyms.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Holstern, Zimmerman, Morrison, Junius, Inquirer, Apprentice.

"THE MONTH."

Alkaloids of the Areca Nut.

The areca nut, as is known, is extensively used as a masticatory by Asiatics, and comparatively recently certain statements made as to its virtues as a vermifuge won for it a temporary place in the British Pharmacopœia. According to 'Pharmacographia' its principal constituents are crystalline fat and red amorphous tannic matter; but about three years ago Herr Bombelon announced that he had separated from the nut by means of ether a volatile liquid alkaloid that he named "arekane" (*Pharm. Journ.*, [3], xvi., 838). The nut has been further investigated by Herr Jahns, who reports that he has separated from it three alkaloids by precipitation of an acidulated water extract with iodide of potassium and bismuth and sulphuric acid and suitable decomposition of the precipitate (*Berichte*, xxi., 3405). "Arecoline," the most important of the three, is described as a colourless oily liquid, having a strong alkaline reaction, soluble in all proportions in water, alcohol, ether and chloroform, and distilling at about 220° C. Its composition corresponds to the formula $C_8H_{13}NO_2$, and it forms salts that are mostly crystalline, readily soluble and hygroscopic, but the hydrobromide is stable and non-hygroscopic. Preliminary physiological experiments have shown this alkaloid to be very poisonous and to be probably the active constituent of the areca nut, to which its reputation as a vermifuge is due. In this respect, as well as in its chemical and physical properties, arecoline appears to approximate to pelletierine, the alkaloid of pomegranate root bark, which is represented by the formula $C_8H_{15}NO$. "Arecaine" ($C_7H_{11}NO_2+H_2O$), the second alkaloid, forms stable colourless crystals, readily soluble in water and dilute alcohol, less soluble in stronger, and almost insoluble in absolute alcohol, and insoluble in ether, chloroform and benzol. An aqueous solution is neutral in reaction and has a faintly saline taste. Arecaine combines with acids to form crystalline salts having an acid reaction and soluble in water. In its properties it appears to stand near to trigonelline, the alkaloid of fœnugreek seeds (*Pharm. Journ.*, [3], xvi., 447), and like it appears to be physiologically inactive. The third alkaloid, as obtained, was amorphous, strongly alkaline, readily soluble in water, alcohol and chloroform, and with difficulty in ether, but was in too small quantity to be closely investigated.

Berberine Salts.

According to Herr Eberhardt, berberine acetate, a salt that is as yet but little known, unlike most other berberine compounds is very freely soluble in water and in alcohol, and very slightly soluble in ether (*Chem. Repert.*, Jan. 1, p. 4). It is prepared by adding 30 grams of berberine sulphate to a solution of 13·6 grams of potassium acetate in 120 c.c. of alcohol, sp. gr. 0·820, and heating gently until it is dissolved. After cooling the liquid is filtered, evaporated to a syrupy consistence, and then shaken with 100 c.c. of ether. The precipitate of berberine acetate that forms is washed with ether and dried in air, and then forms an orange-coloured crystalline powder of the composition $C_{20}H_{17}NO_4\ (C_2H_4O_2)_2$. It is not, however, stable, and loses acetic acid when exposed to air. Berberine sulphate comes into commerce in an amorphous form and crystalline, the latter being considerably the higher priced. But the amorphous sulphate can be changed into the crystalline by heating 15 grams with a mixture of 250 c.c. of alcohol and 8 grams of acetic acid in a return condenser until perfectly dissolved, and then setting it aside to crystallize.

Hydrastine.

Herr Eberhardt also describes how hydrastine may be obtained pure through repeated recrystallization. The method recommended is that the air-dried product of a preliminary purification by precipitating it with ammonia from dilute hydrochloric acid should be dissolved in the least quantity possible of hot chloroform, the solution filtered through glass-wool, and poured into an excess of cold alcohol. The mixture should be shaken vigorously for some minutes, when the hydrastine will separate out as a fine crystalline precipitate, which is washed with cold alcohol, dried, again dissolved in chloroform and precipitated with alcohol, and finally recrystallized from boiling alcohol.

Metamer of Cocaine.

The capacity of the cocaine nucleus for forming new combinations appears to be very remarkable. In some recent experiments Dr. Einhorn obtained as an oxidation product of benzoylecgonine a new acid, to which he gave the name "cocaylbenzoyloxyacetic acid" (*Berichte*, xxi., 3029). By the passage of gaseous hydrochloric acid through a solution of this acid in an alcohol the corresponding ester is formed, and in this way a series of new alkaloids can be obtained, which are the next lower homologues of the corresponding ecgonine esters. As a rule these will probably remain of purely scientific interest, the most notable at present described being the ethyl ester, which it of course follows is a metamer of cocaine itself (*Berichte*, xxi., 3441). This compound, bearing the cumbersome name "cocaylbenzoyloxyaceticethylester," with the formula $C_5H_7N(CH_3)\cdot CHO(C_6H_5)\cdot COOC_2H_5$, has only been obtained yet as a clear transparent oil, but it forms beautifully crystalline salts, of which the hydrochloride, hydrobromide, hydriodide and gold double salt have been described. In addition to the cocaine compounds already noticed Professor Liebermann reports that he has prepared anisylcocaine, the first stage being the production of anisylecgonine from ecgonine, anisic anhydride and water, and the introduction into this product of the methyl radical (*Berichte*, xxii., 130).

Isatropic Acids and Cocaine.

A short time since (*Pharm. Journ.*, Sept. 29, p. 245) Professor Liebermann discovered among the amorphous bases accompanying cocaine in the extract from coca leaves a compound in which an isomer of isatropic acid took the place of the benzoyl radical in ordinary cocaine. Two of these isomeric acids were recognized, which were designated as γ- and δ-isatropic acids, and afterwards it was found that the γ-acid was easily converted through its anhydride into still another isomeric acid, which was therefore named ϵ-isatropic acid. It is now reported (*Berichte*, xxii., 124) that all three of these acids are partially converted during the operation of distillation into cinnamic acid ($C_9H_8O_2$). In an attempt to build up isatropylcocaine synthetically it was found that when γ-isatropic acid was used a compound was obtained that appeared to be identical in every respect with the natural compound, but in splitting this up again not γ- but ϵ-isatropic acid was recovered.

On the other hand, when δ-isatropic acid was used a compound was obtained that yielded the δ-acid again upon being decomposed. In connection with this part of the subject it may be mentioned also that the presence of cinnamic acid among the products of the decomposition of crude cocaine has been recognized by Herr Frankfield (*Berichte*, xxii., 133).

Ergosterin.

An addition to the already fairly-long list of ergot constituents has been made by M. Tanret, who reports that he has separated a crystalline substance closely resembling cholesterin, which he has named "ergosterin" (*Compt. Rend.*, cviii., 98). It was obtained by exhausting ergot with several times its weight of alcohol, distilling and washing the extract with ether, which on evaporation left an oily mass full of delicate crystals. This was dried and the crystals purified by several crystallizations, first from alkaline alcohol, to saponify the contaminating oil, and then from pure alcohol. Ergosterin is described as closely approaching animal cholesterin and its vegetable isomers in its properties, but as differing from them in its composition, which is represented by the formula $C_{26}H_{40}O, H_2O$. It dissolves in 36 parts of boiling or 500 parts of cold 96° alcohol, from which it crystallizes in nacreous spangles; in 38 parts of boiling or 80 parts of cold ether, from which it crystallizes in fine needles, and in 45 parts of cold and in a few parts of hot chloroform. Ergosterin oxidizes slowly in the air, becoming coloured and odorous; this change occurs rapidly at 100° C. and fusion takes place at 154° C. Like cholesterin it is a monatomic alcohol and M. Tanret has prepared its formic, acetic and butyric ethers.

Morphine and Morphine Solutions.

In a lengthy memoir upon morphine, M. Lamal attributes the turbidity, yellow colour, and acid reaction which are developed in aqueous solutions of morphine salts, as well as the separation of crystals, to the action of light and organised ferments (*Journ. Pharm. Chim.*, Jan. 15, p. 62). The yellow colour he considers to be due to the formation of an amorphous substance that appears to be identical with the morphetine of M. Marchand; the crystals are said to be the result of the oxidation of morphine to oxymorphine, and the acid reaction is referred to both morphetine and salts of oxymorphine. The formation of apomorphine in solutions of salts of morphine is denied. M. Lamal states as the result of his experience that an aqueous solution made with a perfectly pure salt of morphine and double-distilled water will remain unaltered as long as it is kept sheltered from light and atmospheric dust. In the organism, M. Lamal says, morphine is sometimes entirely, sometimes partially converted into oxymorphine, both the oxymorphine and any unaltered morphine being eliminated with the urine. It would be important therefore in toxicological investigations to search in the blood, urine and vascular organs for oxymorphine, the presence of which would be an additional proof of the ingestion of morphine.

Strophanthus and Strophanthin.

In a recent number the *Therapeutical Gazette* directs attention to the fact that there are now not only several kinds of strophanthus in commerce, but that several apparently different active principles have been obtained from the different varieties of the drug met with in commerce under the same name, whilst we are still in the dark as to the species which yield the different kinds of strophanthus and the difference in physiological activity of the strophanthin or strophanthidin obtained from them. This uncertainty is rendered still more complex by the confusion that prevails among the pharmaceutical preparations of the drug. These difficulties will probably be best met by the recognition of one definite variety of the seed. The distinctive botanical characters of the fruits appear to reside partly in the character of the funiculus of the seed and its mode of attachment, but as this character is not easily determined except by a botanical expert, on account of the readiness with which the funiculus becomes detached from the seed, the authoritative definition of the measurement of the mature seed within given limits, and the character of its surface, whether hairy or glabrous, together with an official and definite formula for the preparation to be used, will probably be the best means of enabling the retail pharmacist to obtain a seed and a preparation which will give as nearly as possible a uniform therapeutic result. Evidence as to the varying nature of the crystalline principles obtainable from different species of *Strophanthus* is afforded by some recent researches. It will be remembered that a short time since (*Pharm. Journ.*, [3], xviii., 902; xix., 162) M. Arnaud separated from the wood of an apocynaceous plant, used as an arrow poison in the Gaboon, a crystalline principle which he named "ouabain" ($C_{30}H_{46}O_{12}$) and supposed to be a lower homologue of the strophanthin ($C_{31}H_{48}O_{12}$) that he had obtained from the seeds of *Strophanthus Kombé*. He now reports (*Compt. Rend.*, cvii., 1162) that from the seeds of *Strophanthus glabrus*, or inee seeds, from the Gaboon, he has isolated a crystalline principle that differs from strophanthin from *S. Kombé*, but in respect to its composition and chemical and physical properties appears to be identical with the ouabain from ouabaio wood (*Acokanthera Ouabaio*), which was found to be much more active physiologically than strophanthin. In addition, M. Catillon has announced (*Journ. Pharm. Chim.*, Jan. 15, p. 41) that he has obtained from *Strophanthus Kombé* seeds, after the removal of all the strophanthin, a nitrogenous principle, which according to the results of experiments made upon rabbits and upon himself would appear to be the diuretic constituent in preparations of strophanthus. This substance, which is soluble in water and in 70 per cent. alcohol, but less soluble in stronger alcohol, gives some alkaloid reactions, but appears really to be an amide, and is obtained as a calcium compound. It is not surprising, therefore, that in a recent discussion in the French Academy of Medicine (*Lancet*, Jan. 26, p. 199) there was a consensus of opinion as to preparations of strophanthus differing in their action from strophanthin, but whereas Dr. Bucquoy and Dr. Dujardin-Beaumetz were of opinion that the best results were obtainable with the former, Professor Germain Sée maintained that the advantage was with the definite principle strophanthin.

Iodoform.

A short time since (*Pharm. Journ.*, Sept. 29, p. 248) attention was called by Herr Neuss to the fact that some samples of iodoform, and especially those of a well-known brand sent out as "absolutely pure," although they answered to the tests of the German Pharmacopœia, gave immediately dark coloured ethereal solutions,

due to the separation of iodine, and this was assumed to be evidence of the presence of a special impurity. As the result of many experiments, Herr B. Fischer has however come to exactly the opposite conclusion, and looks upon the rapid darkening of a solution in ether or benzol as evidence of the purity, both of the iodoform and of the solvent (*Pharm. Zeit.*, Jan. 12, p. 31). In fact, samples of iodoform that gave solutions which remained pale yellow for some time, lost that property after they had been purified by recrystallization. It was found that pure iodoform, free from air, dissolves in a solvent also free from air with a pale yellow colour, and retains this colour so long as access of air to the solution is prevented; but directly there is contact with air decomposition begins and the solution assumes a dark colour. The slower change in solutions of impure samples is attributed to the fact that the alteration of colour appears to be retarded by minute quantities of such substances as hydroquinone, pyrogallic acid, aniline, the pyridine bases or aldehyd, possibly because they combine with the atmospheric oxygen, or, it may be, with the iodine as it is set free.

Sulphur in Ether.

The occurrence of free sulphur dissolved in commercial samples of "pure ether" is reported by Herr Koninck (*Apot.-Zeit.*, Jan. 19, p. 71). Its presence can be easily and rapidly detected by shaking a little of the ether in a test tube with one drop of pure metallic mercury. If the ether contains only a minute quantity of sulphur the surface of the mercury becomes of a dull grey, but if there be relatively much sulphur present the liquid becomes grey or black through the formation of sulphide. Herr Koninck considers that this observation is of special importance to pharmacists, since free sulphur would probably not occur unaccompanied by organic sulphur compounds.

Test for Saccharin.

Börnstein's test for the presence of saccharin, recently referred to in this Journal (June 2, p. 1005), which consists in the development of an intense fluorescence on diluting with water and rendering alkaline a liquid obtained by heating an ether residue containing saccharin with sulphuric acid and resorcin, has been adversely criticized by Mr. S. C. Hooker, who has pointed out that fluorescence is developed when resorcin alone is treated in the manner described (*Berichte*, xxi., 3395). Herr Börnstein has responded (*Berichte*, 3396), admitting that the reaction is common to resorcin and other organic compounds, but claiming that his test is based upon the greater delicacy of the reaction with benzoic-sulphinid, one milligram of saccharin being sufficient to impart a distinct fluorescence to five or six litres of solution, whilst several decigrams of resorcin alone are required to produce an equal effect. Herr Börnstein says that half a centigram of the residue from an ether extract of the substance to be examined is sufficient for an experiment, together with double its weight of resorcin and 2–3 drops of sulphuric acid. If the whole operation be carried out in a test-tube of about 25 c.c. capacity, the sudden appearance of a green colour in reflected light at the moment of the passage of the solution into an alkaline condition will be distinctly apparent if only two milligrams of saccharin be present.

Antipyrin.

Although introduced as an antipyretic it seems likely that antipyrin will take even a higher position as an anodyne, and at least an equal position with many other antiseptics. Dr. Walter G. Smith, in his half-yearly report on materia medica and therapeutics (*Dublin Med. Journ.*, Dec., p. 515) remarks that "there seems no reason to doubt that in antipyrin we possess a powerful anodyne for pain of nervous or rheumatic origin." In a case which came under the notice of the writer, a neuralgia of rheumatic origin, accompanied by sleeplessness, and which had resisted all the ordinary remedies for neuralgia, yielded at once to a single dose of antipyrin, and did not again recur even after the lapse of several days. The only objection to its use seems to be the disagreeable symptoms that in cases of idiosyncrasy sometimes occur. These, however, are of a disagreeable rather than of a dangerous kind, consisting in considerable temporary congestion of the mucous membrane, urticaria, and a quick and full pulse. In one case of this kind atropine was found to act promptly as an antidote, and another yielded more gradually to an emetic and purgative.

Antipyrin and Calomel.

The death in New York of a child after the administration of a combination of antipyrin and calomel, under conditions that gave rise to suspicion that death might have been the result of incompatibility between the two compounds, led to the institution of some experiments to test whether any reaction took place between them leading to the formation of corrosive sublimate (*Drug. Circ.*, Jan., p. 1). Mixtures of antipyrin, calomel and water, and of the same with hydrochloric acid, were allowed to stand for several weeks, at the end of which in neither could the slightest trace of corrosive sublimate be detected. There was, however, a slight blackening of the calomel, which was most pronounced in the mixture not containing hydrochloric acid. In the same journal (p. 4), Professor Pengra reports a case of mercurial poisoning following the administration of calomel, where the "powder" had been washed down with lemonade, and also states that he has observed mercurial tremors produced in a patient receiving minute doses of mercurous iodide by the drinking of a glass of commercial cider.

Thymol-Mercury Acetate.

"Hydrargyrum thymoloaceticum" is a new mercurial compound that is said to have been used with success as an antisyphilitic, both in the form of intromuscular injections, which seldom produce smarting or infiltration, or administered in the pill form in doses of 0·05 to 0·1 gram (*Apot.-Zeit.*, Dec. 29, p. 1091). It is described as occurring as a white microcrystalline powder, odourless and tasteless, soluble in dilute alcohol, but almost insoluble in water. Its composition is represented by the formula $C_{10}H_{13}OHg-HgCH_3COO$.

β-Naphthol Mercury.

Another mercurial that has just been introduced is "hydrargyrum naphtholicum," a compound of β-naphthol with mercury, which is described as being obtainable crystalline or as a yellow, neutral, odourless powder, containing 30·8 per cent. of metallic mercury, and insoluble in ordinary solvents (*Pharm. Zeit.*, Dec. 8, p. 740). It melts to form a green oil-like liquid, which upon being heated more strongly carbonizes, globules of mercury making

their appearance. Diluted with roasted kieselguhr (1 or 2 parts to 100), or as a *salbenmull*, or rubbed up with fresh albumen and diluted with water, it is said to promote the healing of wounds in a remarkable manner, and it is also said to be a mild antisyphilitic; but it is also claimed that it has a specific action in killing the typhoid bacillus, and that therefore, in doses of 0·05 gram several times daily, according to the body weight of the patient, it is very useful in the treatment of typhoid fever. It may be also mentioned that a naphthol-mercury acetate, corresponding to the thymol compound referred to in the preceding paragraph, has also been prepared, as a very pale yellow odourless and tasteless powder, but the therapeutic action is said to approximate closely to that of the simpler naphthol compound.

Phenylhydrazin as an Antiseptic.

Attention is called by Herr Marpmann to the value as an antiseptic of phenylhydrazin hydrochloride, which, he says, when added in the proportion of 1 in 1000 to milk will preserve it several days (*Chem. Rep.*, Dec. 22, p. 343). It is unsuitable for use as a food preservative on account of its unpleasant taste and poisonous properties when taken in quantity; but he recommends it as a substitute for mercuric chloride in medical practice. Solution of phenylhydrazin gives no precipitate with ammonia, milk, pus, albumen, or gum and sugar solutions, in which it presents an advantage over mercuric chloride and carbolic acid, both of which cause a precipitate in albumen solutions. Herr Marpmann says a relatively non-poisonous solution of 1 in 1000 of phenylhydrazin hydrochloride may be used in the place of a solution of mercuric chloride of similar strength.

Pyrodin.

In a communication to the *Therapeutische Monatshefte* Dr. O. Liebreich refers to a statement in a letter received by him from Dr. Drechsfeld to the effect that pure acetylphenylhydrazid is four times stronger in its action than pyrodin. It follows therefore that the doses specified by Dr. Drechsfeld for pyrodin are not applicable for pure acetylphenylhydrazid, for which Dr. Liebreich suggests maximum doses of 0·03 to 0·06 gram for children and of 0·12 to 0·18 gram for adults, the maximum dose *pro die* being 0·2 gram. The *Pharmaceutische Zeitung* (Jan. 5. p. 15), commenting upon this communication, points out that the practical conclusion for the pharmacist to draw from it is that pyrodin and acetylphenylhydrazid are not identical, the former at present being an impure product, and that, therefore, acetylphenylhydrazid should not be dispensed unless it is specially ordered. This incident, evidently, will not tend to disperse the uncertainty that at present exists as to the use of this substance.

Potassium Iodide and Milk.

Attention is called by Dr. Blair to the value of milk as a vehicle for the administration of potassium iodide (*Bost. Med. Journ.*, Dec. 27, p. 64). He states that a goblet of milk will almost completely cover the taste of a dose of the iodide without apparently interfering with its medicinal properties, and that by means of it a patient who could not tolerate ten grains of potassium iodide at a dose was in a short time able to take forty grains without any symptoms of nausea.

Four cases of poisoning by amylene hydrate, administered for the purpose of inducing sleep,

Administration of Amylene Hydrate.

have been reported from Leipzic under circumstances that are worthy of note by dispensers (*Med. Chron.*, Jan., p. 345). A mixture containing amylene hydrate had been prepared for use in a hospital as required, general directions to shake the bottle being given. On one occasion doses taken from the bottle without previous shaking were given to four different patients, the consequence being that as the amylene hydrate in virtue of its light specific gravity had accumulated towards the top of the mixture an excessive quantity of the active ingredient was ingested in each case. The symptoms following were those of acute poisoning by alcohol: prolonged sleep, paralysis of the extremities, abolition of tactile sensibility and of the reflexes, dilatation of the pupils with feeble reaction to light, superficial irregular respirations and small slow pulse. The patients were subjected to hypodermic injections of camphor and all recovered.

Myosis after Salicylate.

The occurrence of an extreme contraction of the pupil after the administration of large doses of sodium salicylate is reported by Dr. Gibson (*Practitioner*, Jan., p. 16). The patient was a lady of middle age, who was treated for a rheumatic affection with twenty-grain doses of sodium salicylate every two hours. Myosis and failure of the pupils to react to light appeared within eight hours and did not pass away entirely until thirty hours after the administration of the last dose.

Creasote and Cod Liver Oil.

The administration of cod liver oil in combination with creasote, according to the formula, creasot. 2·5, ol. jecor. asell. 2000, saccharini 0·1, is recommended by Dr. Seiz (*Münch. med. Woch.*, Jan. 8, p, 35). The advantage claimed is an improvement in the flavour, which is said to resemble that of smoked schinken. The dose for adults is a tea- to a table-spoonful one to three times daily: for children less in proportion. If the dose be commenced low and gradually increased it is said the appetite does not suffer.

Asparagin and Tyrosin in the Dahlia.

Asparagin and tyrosin are, according to Herr Leitgeb, constant constituents of the dahlia tuber (*Zeit.-öster. Apot.-Ver.*, Jan. 20, p. 44). He states that if a transverse section of a tuber about a centimetre thick be laid in 90 per cent. alcohol it becomes after a few days covered with asparagin crystals, and tyrosin also can be detected. Herr Leitgeb expresses the opinion that plant parts may be rich in both these substances, without their separation taking place in a crystalline form through the agency of alcohol if the crystallization be retarded by an accompanying viscous substance, which in the case of the dahlia is inulin.

Magnolia glauca.

In the *American Pharmaceutical Journal* (Jan., p. 8) the editor points out that the leaves of *Magnolia glauca* possess a property that is not generally known, viz., that if a fresh leaf be placed upon linen and any word or name traced with some pressure upon the leaf, the linen below will be marked with an impression at first of a greyish-green colour, but which ultimately becomes gradually darker, and does not disappear on washing.

A pigment apparently identical with Indian ink

can, according to Mr. Piffard, be produced by the action of sulphuric acid on camphor (*Chem. News*, Jan. 25, p. 47). He states that if an excess of camphor be placed for about twenty-four hours in strong sulphuric acid a reddish gelatinous mass results, which, when heated, gives off fumes of sulphurous acid and turns intensely black. The superfluous weakened acid and camphor, for there remains an excess of both, are driven off by heat, and the residue constitutes the pigment. It appears to be dissolved, not merely suspended, by water, and remains an indefinite time without precipitation.

Indian Ink.

An investigation recently undertaken by Mr. A. H. Allen, the results of which were laid before the Society of Public Analysts at its December meeting (*Analyst*, Jan., p. 5), has apparently demonstrated that the composition of genuine butter is not restricted within the limits at present assumed, but that it has a latitude which, with present knowledge, may render difficult the detection of a moderate addition of foreign fat. The inquiry had its origin in the condemnation as adulterated of a sample of Swedish butter by a public analyst and the confirmation of this opinion by the experts at Somerset House, to whom the sample was referred. The maker of the butter, however, challenged the decision and sent a sample of butter from the same farm to Professor Stein, the official analyst to the Danish Government, who found it to contain so small a quantity of volatile acids that under ordinary conditions he would have felt warranted in questioning its genuineness. In consequence of the importance of this experience to the Scandinavian butter industry, Mr. Allen was formally invited to visit Denmark, and together with Professor Stein and the British Vice-Consul, went to two farms, where milk drawn in their presence, in one case from a herd of thirty-one cows and in the other from sixty-five cows, was churned under their personal supervision, and samples of the butter from both farms were taken to Copenhagen for examination. It was found that the volume of decinormal alkali required for the neutralization of the volatile acids obtained by Wollny's modification of the Reichert process from five grams of butter was in the one case only 22·53 c.c., and in the other 24·76 c.c., whereas the figures obtained with pure butter in Professor Stein's previous experience had ranged from 31·59 c.c. to 25·08 c.c., with an average of 28·64 c.c. As the result of a second and more leisurely examination of the butter after returning to this country Mr. Allen found that one sample had a density (0·8639) quite outside previous experience of butter fat, required a volume of alkali for saturation of the volatile acids sensibly below the unit hitherto recognized, had a saponification equivalent (253) at or beyond the extreme limit hitherto observed, contained a proportion of soluble fatty acids lower than had been previously observed in any genuine butter, and had the insoluble acids sensibly in excess. The same remarks apply, though somewhat less strongly, to the butter from the other farm.

Butter Testing.

An examination of the liquid fat acid of olive oil has led Messrs. Hazura and Grüssner to the conclusion that it is not a homogeneous substance, but a mixture of oleic acid ($C_{15}H_{34}O_2$) and linoleic acid ($C_{18}H_{32}O_2$), in the proportion of 93 per cent. of the former to 7 per cent. of the latter (*Monatshefte*, ix. 944). The authors are of opinion that linoleic acid also occurs in most of the non-drying oils, in which at present the presence of oleic acid alone is assumed, and they purpose extending their investigation to other oils.

Olive Oil.

SOLUTION OF ALBUMINATE OF IRON.*

The Pharmacopœia Committee of the German Pharmaceutical Association proposes the following test for *Liquor ferri albuminati*:—

Dissolve 30 parts of dry albumen in 1000 parts of lukewarm water, strain, and pour the liquid into a mixture of 120 parts of solution of chloride of iron (*Germ. Pharm.*, specific gravity 1·280–1·283, equal to 10 per cent. metallic iron) and 1000 parts of lukewarm water. To cause the separation of the iron albuminate very dilute solution of soda is to be added in drops, if necessary, until the liquid is exactly neutral. Allow the precipitate to settle, then decant the supernatant liquid, wash the precipitate repeatedly with lukewarm water, collect it upon a moistened cloth strainer, and allow it to drain. Then transfer it to a porcelain capsule, add a mixture of 5 parts of soda solution (10 per cent.) and 50 parts of water, and promote solution by stirring. Next add 250 parts of cinnamon water (*Germ. Pharm.*), 100 parts of alcohol (sp. gr. 0·830–0·834), and 50 parts of brandy, and dilute with enough water to make the whole weigh 1000 parts.

The product is a clear, or but faintly turbid, reddish-brown liquid, of a scarcely perceptible alkaline reaction, tasting of cinnamon and faintly of iron, and containing about 4 parts of iron in 1000 parts. Addition of solution of chloride of sodium or of hydrochloric acid precipitate it: ammonia does not affect it, and alcohol may be mixed with it without separation. On diluting the solution with water (1 in 20), it should not be rendered blue by ferrocyanide of potassium, nor should tannic acid impart to it a dark colour.

From the Commentary attached to this formula by the Committee, the following portions will be of special interest to those who make or use the preparation in this country.

The preparation of albuminate of iron requires certain precautions, if a perfect product is to be obtained. It is necessary to guard against the access of chloride of sodium, and still more so against that of carbonic acid. The following are the principal points which must be paid attention to. The water used for dissolving the albumen and for dilution of the iron solution must be lukewarm, but not above 50° C. In order to exclude every trace of carbonic acid, it is best to use water which has been boiled, and allowed to cool out of contact with air. The precipitated iron-albuminate must also be washed with water freed from carbonic acid. The washing itself must be continued until all the chlorine has been removed. Since the albuminate of iron will only separate when the liquid is exactly neutralized, the addition of a small amount of soda is usually necessary. It may, however, occur that the precipitate appears without the addition of soda; that is, the liquid may have attained the neutral point without it. At all events, great care is to be used not to add the slightest excess of soda, since this would exert a solvent action upon the precipitate. Hence the soda solution used for neutralizing must be very dilute (say 1 or ½ per cent.), though still reacting with very *delicate litmus paper*. Such litmus paper may be prepared by impregnating fine white "post" paper with a not too concentrated aqueous infusion of litmus, to which enough dilute nitric acid had been carefully added to change its colour to violet, that is, intermediate between blue and red. When dry, the

* From *Pharm. Post*. Reprinted from the *American Druggist*, January.

paper will have a pale violet hue, and will be rendered blue or red by the least trace of alkali or acid, respectively. The washed precipitate must be dissolved without delay, in the prescribed quantity of soda solution. The whole process must be carried out quickly, at all events inside of one day, as the precipitate is liable to become less soluble by long standing. It will not do to press the precipitate upon the strainer, simple draining is required. Of the greatest importance is the quantity, quality, and mode of addition of the soda used for dissolving the precipitate. The smallest possible quantity of soda, which will effect solution, produces the clearest product. Any excess of soda will decompose the albuminate more or less, and will render it less soluble. Hence the soda must be added very dilute, and not in portions, but all at once, being immediately mixed with the precipitate by quickly stirring. The solution of soda must be as free as possible from carbonic acid and comply with all the pharmacopœial tests. In place of the dry, fresh albumen may be taken. But as the latter varies in its percentage of water, the proper quantity must be determined by experiment. Usually 75 parts of fresh albumen yield 10 parts of dry. The latter is easily prepared by passing fresh albumen through loosely woven gauze, and exposing it in thin layers, upon flat plates, either to sun-light, or to artificial (moderate) heat in a warm room, until it peels off the plate.

INFLUENCES OF HEAT.*

BY J. U. LLOYD.

Some time ago, a decoction of pomegranate bark was brought to my attention with a question as to its probable value. This decoction I had made seven years ago, bottled while hot, and it had been standing from that day unopened. Arguing from my knowledge or belief regarding many other vegetable constituents and the influence of heat and water, I gave as an opinion that this aged decoction would be unreliable, and in reply to the question propounded, stated that I should certainly decline to use it.

Afterward, the fact was made known to me that this decoction, seven years old, really retained its virtues, perhaps unimpaired. It had been given in the usual manner and had promptly expelled a tapeworm.

In this connection we are again confronted with the fact that perhaps the only rule that is without exceptions is the rule of exceptions. Take our organic materia medica, and we find many drugs that are rendered valueless by heat, but this does not in my opinion, as I now view the subject, approach as nearly to a general rule as was formerly accepted. Upon the contrary, the heat of boiling water directly applied for a brief period is certainly not uniformly destructive to many rather delicate plant constituents. I have come to view the matter in a different light than formerly, and am convinced that peculiar ferments or destructive agencies that work rapidly at moderate temperatures are to be more particularly avoided, and exert a more objectionable influence in many cases upon plants in contact with aqueous liquids than a quickly applied temperature of 212° F. Indeed, it seems not improbable that a study of drugs will yet show that some that are injured by drying might often be sterilized, and even evanescent principles therein preserved indefinitely by the application of a quick boiling heat or current of steam and immediate preservation in air-tight barrels or vessels. It is often the long continued action of a boiling temperature or of atmospheric exposure that finally disintegrates, and it has seemed to me in some cases that have come under my observation that from a start, slow at first, the disorganization becomes accelerated and moves more rapidly as the boiling process continues, the noticeable changes becoming very rapid after a time, as though proceeding under the action of an accelerating ferment.

In considering this phase of observed alterations, more than one reason presents itself in possible explanation thereof. It requires a certain period as well as a certain temperature to accomplish many chemical reactions that are well understood. It requires a period of time, as well as the boiling temperature employed, to disintegrate the naturally associated tissues or constituents of vegetable substances. It is not unlikely that in many cases the actual dissociation of classes of bodies connected with plant tissues precedes by a considerable time the molecular decomposition of members of certain constituents. It is probable I think that the partial destruction of one class of bodies frequently may accelerate as it precedes that of another, and that the beginning of a change in one direction may add fuel to the influences at work in another, somewhat after the manner in which fermentation often, perhaps usually, starts slowly, and then with increasing rapidity rushes onward until the end is reached by reason of exhaustion of the substance preyed upon.

In this connection, there is to be offered another and perhaps to many persons a more rational explanation of the cause for alterations in the making of extracts by means of boiling temperature, that partly explains how there should be an increase in alteration as the end approaches. At first it requires but 212° F. to boil the water, in fact it is simply the boiling of water containing a drug, but as this water becomes charged with extractive matters the temperature rises, the solvent changes from water to a more or less viscid liquid, and as the extract thickens the temperature may run to 218° or 220° F., and hence there is actually a higher temperature with the constant progress of concentration or changes attendant thereon.

This well-known fact, however, is not sufficient to account for some observed individual phenomena, and there is an influence of time to consider as well as that of heat. In making, for example, some plant concentrations, a liquid may be evaporated to a tenacious consistence, and remain brilliant without apparent coloration, if a quick heat and constant boiling temperature be applied, providing the period of action be reduced to less than half a minute. Accomplish the same result with exactly the same evaporation in two minutes, with a lower temperature even, and perceptible coloration follows. Evaporate the liquid slowly, using an expanded steam bath to guard against a high temperature, thus covering much time but with less heat, and the coloration is more marked; at last, by means of the vacuum apparatus, with a temperature that does not reach the boiling point at all, nor nearly so, but covering a greater period of action, two or more hours, and the change of the product is as great or greater than that produced by the quickly applied high temperature of less than half a minute.

This is true of many sensitive substances. In considering alterations by even the apparently simple operation of extraction by heat and water, there are points of interest beneath the surface, that in my opinion remain to be developed. From a consideration of the study that I have been permitted to apply in these directions, I have long been convinced that valuable disclosures will yet follow the systematic application of a series of pharmaceutical investigations in this direction. It would, I think, be shown to others as it has to me, that we have less cause to fear a properly applied boiling temperature than is now generally accepted, and that many of our unstable drugs are not perceptibly injured by a quick temperature of 212° F. It will be shown I think that a universal rule cannot be, and should not be applied to the making of any line of plant preparations;

* Read before the Cincinnati Eclectic Medical Society, and communicated by the author.

that in some cases the continued application of heat may be destructive to a desirable constituent but of advantage if quickly applied, and that yet in others it may be necessary to continue it in order to dissociate and extract; and that in others still a continued high temperature may really develop from existing principles a valuable agent, or destroy or evaporate some objectionable substance that is more evanescent than the desired principles.

Be this as it may, it seems evident that neither drying the bark, storing it for years in a dry situation, boiling it in water for half an hour, nor keeping the decoction for seven years, destroys the value of pomegranate, and I have reasons for this belief besides the example cited as an illustration in this paper.

PERMANENT SYRUP OF HYDRIODIC ACID.*

BY JOSEPH W. ENGLAND, PH. G.

Hydriodic acid as a remedial agent first came into vogue some thirty years ago through Dr. Buchanan, who strongly urged its use as an alterative. Since its introduction it has found a limited and varying demand amongst the medical profession.

There seems to be good grounds for believing that its failure to meet popular favour may have largely been due to the fact that the solution is exceedingly unstable, unless well protected by sugar and kept in close-stoppered vials. Even then it has been a most unsatisfactory preparation, pharmaceutically, tending readily to decomposition, on exposure to air, into free iodine and water, the former of which, by its presence, rendered it a local irritant instead of an alterative.

Of late, however, there seems to be a tendency to return to its use, especially as there are now obtainable in the markets a number of syrups of hydriodic acid claimed to be unalterable on exposure to air.

Various preservative substances are used to achieve this end, such as honey, potassium hypophosphite and hypophosphorous acid; glycerine has little or no influence in retarding decomposition.

The new National Formulary (p. 122) gives a formula for the preparation of a colourless hydriodic acid syrup, prepared by double decomposition between potassium iodide and tartaric acid in the original way, but preserving it from oxidation with potassium hypophosphite.

This formula, in its practical workings, is most excellent, and in the writer's opinion, superior to the pharmacopœial process of iodine and sulphuretted hydrogen. There is one point in it, however, upon which criticism might be turned and that is the presence of the potassium hypophosphite, or, what is more probable, hypophosphorous acid, since some acid tartrate of potassium still remains in the finished solution unprecipitated, but the quantity of this salt used is so small that this feature, practically, need not be regarded.

The writer has used this formula since last August, with but one modification in detail, and that was the substitution of syrupy glucose for potassium hypophosphite, as the preservative. A sample of some made last August is as clear and destitute of free iodine as some made yesterday. The modified formula is as follows:—

Iodide of potassium	123	grains.
Tartaric acid	112	,,
Water	½	fluid ounce.
Diluted alcohol	1	,,
Syrupy glucose	¼	,,
Syrup, enough to make	16	,,

Dissolve the iodide of potassium in one-half (½) fluid ounce of water and the tartaric acid in one-half fluid ounce of diluted alcohol. Mix the two solutions in a vial, cork and shake it well, and then place it in ice-water for about half an hour; again shake it thoroughly, and then pour the mixture upon a small white filter, and filter into a bottle containing 13¾ fluid ounces of syrup and one-fourth (¼) fluid ounce of syrupy glucose. When the liquid has run through, wash the vial, and filter with one-half (½) fluid ounce of diluted alcohol, added in several portions. Then add enough syrup to make sixteen (16) fluid ounces.

The product is a clear, transparent, almost colourless liquid, odourless, having a pleasant acidulous taste, and evincing no free iodine, on the addition of cold gelatinized starch. It remains unchanged on exposure to air. Syrupy glucose is used in place of the solid compound, because it is more convenient and fulfils the same purpose. One peculiarity noticeable with its use is the fact that syrups of hydriodic acid made with it, and containing, at first, free iodine, from faulty manipulation, become, on standing for a day or two, colourless from the conversion of the free iodine, by the glucose, into hydriodic acid.

* Read before the Pharmaceutical Meeting, Philadelphia, December 18. From the *American Journal of Pharmacy*, January.

A STRANGE CASE OF POISONING.

BY T. H. POWELL.

Some months ago I was asked to throw some light on a strange case of suspected poisoning which had taken place a few days previously. The unfortunate victims were fowls, which, to the number of thirty-six, had first "gone off their feed," and after a couple of days illness had died in convulsions. The fowl-yard, however, had not been completely decimated, fourteen had survived, and these were, without exception, young birds. No definite information could be obtained as to the probable cause of death, but it was suggested a vermin killer of some sort had probably been the agent. On stirring a small quantity of the food-mass with water several particles of a bright yellow metallic looking substance were noticed. These were separated, washed and examined under the microscope, and had all the appearance of gold leaf, which on chemically testing they proved to be. But the discovery of gold leaf, however unexpected, gave no clue to the cause of death, and the food mass was therefore tested for arsenic, mercury, antimony, and phosphorus, but without any affirmative result; on further testing, however, lead was found in considerable quantity existing in the form of chloride. Iron, too, was present, probably derived from the gravel stones; it was also found in the contents of a healthy crop obtained for comparison.

On sending in my report the mystery was at once cleared up. The boys of the house had been dabbling in chemistry, and for more reasons than one their experiments had been conducted in a loft over a stable in which the fowls roosted every night; the flooring of the loft had been roughly put together and the interstices between the floor boards had not been filled up; the gold leaf, chloride of lead and other chemicals had fallen through, and the fowls, although they had shown some discrimination, found the crystals of chloride of lead more than they could resist.

A writer in 'Science Gossip,' (xiii., 71) mentions a very similar case. His chickens first suffered from distended crops, then spasmodic contraction was noticed, followed by partial paralysis of the legs, death ultimately occurring within three or four days. The birds curiously enough ate voraciously during their illness. A post mortem showed the crop and gizzard to be loaded with food, but all the intestines were absolutely empty and much emaciated. The crops contained nothing to account for death, but in the gizzard were found a number of lead shot which, carelessly spilt in the fowl yard, had been mistaken for grain and swallowed accordingly. Olive oil was administered in some cases and proved a successful antidote. This case was, in one respect, the reverse of the preceding, only one of the old birds succumbed, the victims were all young chickens.

The Pharmaceutical Journal.

SATURDAY, FEBRUARY 2, 1889.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary, 17, Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

PHARMACEUTICAL LEGISLATION.

IT may be expected that the approaching session of Parliament will furnish opportunity for the re-introduction of a Pharmacy Act Amendment Bill, and that after the disappointments that have been experienced it will be attended with success. The pharmacists of Great Britain are not the only ones who are in the same situation and seeking for amendments of the law by which the practice of their art is regulated. That is also the case in France, and on several occasions we have referred to the new projects of legislation which have been brought forward there. These attempts have hitherto proved unsuccessful, and at the last meeting of the council of the General Association of Pharmacists in France it was announced that M. LETELLIER, the reporter of the Legislative Commission, charged with the preparation of a pharmacy bill, had deposited a report on the subject with the Chamber of Deputies. The *Répertoire de Pharmacie*, in commenting upon that report, states that the Commission has not been influenced by the agitation that there has been throughout the pharmaceutical body in reference to some articles of the proposed new law and has not in any degree modified the resolutions it had arrived at. Thus, for instance, it has adhered to the principle adopted from the beginning in regard to suppression of the diploma of pharmacien of the second class, and it has not yielded to the considerations urged by the Government in favour of the maintenance of that diploma. The article which proposed to authorize any kind of association between pharmacists and persons who are not pharmacists has been retained without modification, and our contemporary speaks of this feature of the project as being fraught with dangers. Another point in regard to which there is a difference of opinion between the Commission and the Government is the extent of the restriction as to supply of medicines by medical men, the latter being disposed to relax that restriction. In several other respects there is evidence of considerable conflict of opinion prevailing, but as this has relation to the restriction on the sale of simple drugs, and to the inspection of pharmacies which are regulations that have no counterpart in this country, it will be unnecessary to speak of them more in detail.

It may, however, be gathered from what has been said that among French pharmacists there is much the same feeling of dissatisfaction with the existing state of the law affecting them that there is in this country, and allowing for the different conditions under which the exercise of the art is carried on in the two countries there is in both cases a desire to devise means for securing adequate protection against the forms of competition that are growing up at the present time. As regards the circumstances more immediately affecting ourselves there has recently been an excellent exposition of the means by which protection is to be sought for in the paper read by Mr. GRIERSON, and published in this Journal the week before last. Recognizing to the full extent the fact that the Pharmacy Acts fail in themselves to provide qualified chemists and druggists with the exclusive trade in drugs which they think they are entitled to, Mr. GRIERSON was none the less explicit in his declaration that he had no faith in the possibility of obtaining legislation of a more restrictive character. Such an expression of opinion will no doubt be unpalatable to many, but we fully believe that it conveys a correct estimate of the position. That is in fact one of the chief lessons to be learnt by chemists and druggists, and it is one of the first importance, since it would naturally lead to a better appreciation of the means by which an improvement in their position may reasonably be looked for and secured. Under the influence of the present rule of free trade doctrines the pharmacist must protect himself, and the mode in which he may do so was well described in Mr. GRIERSON'S paper. In the present number of the Journal there is another paper read at a meeting of the Chemists' Assistants' Association, by Mr. STARK, which also deals ably with the same subject in a manner which we think is both reasonable and practical. To some extent the author appears to entertain a hope for restrictions in the sale of drugs on the ground of the inconsistency between present practices, but at the same time he recognizes that if any improvement is to be achieved in that direction very much will have to be done by the members of the pharmaceutical body from within before there can be room for any advance. By his comparison of the existing state of pharmacists in this country with the history of the College of Surgeons he showed that it is still wanting in those claims to better recognition, either by the State or by the public, by which medical men acquired the protection they now enjoy. It is not by mere legal restriction that pharmacists can hope for protection, but by the demonstration that they are collectively better able to exercise their calling with benefit to the public than any other class pretending to do so. To arrive at that position it is necessary that education should be more thorough, and from the first step of apprenticeship to the final granting

of a qualification to practice it should be the care as well as the duty of every pharmacist who desires protection to assist in preventing any but those who have proved themselves fit for the calling from being admitted to the position of possible future competitors.

But there are other directions also in which the pharmacist will require to help himself. In various ways the evils he is experiencing to-day are but the consequences of earlier mistakes, perhaps not of himself individually, but of the class to which he belongs. Take, for instance, the trade in patent medicines, which is now the source of so much dissatisfaction. Properly regarded it forms no part of a pharmacist's business, is in fact antagonistic to and destructive of it. But the allurement of a ready profit has been allowed to hide that fact from notice, and chemists have largely assisted in promoting the trade in patent medicines to their own eventual detriment. And now, having done so, when they are in danger of losing the mess of pottage for which they sold their birthright, many are even willing to scramble for the remains of it with the grocers and the stores. But the new gospel of "cutting" will not save the pharmacists who trust to it. The only result that it can bring will be to reduce them still more to the level of a class of traders who have not and do not require to have anything in common with them, and the more frequently that happens with individuals the longer the improvement of the position of the body at large will be hindered and delayed.

The number of the *Berichte* of the German Chemical Society just received, contains a paper by Messrs. Krüss and Schmidt, giving a full account of their interesting investigation of cobalt and nickel, the chief features of which were published in this Journal two weeks ago. The oxide of the new metal they have discovered resembles to some extent alumina and zinc oxide, but distinctly differs from both. The further investigation of this metal and of the pure nickel and cobalt compounds is being proceeded with, as well as the determination of true atomic weights of nickel and cobalt, and meanwhile the authors abstain from any speculative remarks on these points. The quantity of the new oxide obtained from fifty grams of nickel oxide amounted to about one gram, and the metal obtained from a solution of the chloride by electrolysis, or by reduction with hydrogen, was black or brownish, in thin fragments, and readily soluble in acids.

* * *

In referring to the recent issue of the National Formulary under the auspices of the American Pharmaceutical Association the *Therapeutic Gazette* expresses a fear that it may grow until it becomes a rival of the United States Pharmacopœia, and that the United States may thus have conferred upon it two rival standards, each claiming to be *the* standard. Although our contemporary has never hitherto favoured the proposals introduced into Congress for giving a legal standing to the United States Pharmacopœia, it is of opinion that if this list is to be continued and grow in importance confusion will only be prevented by legislative action.

Russian liquorice, which hitherto has been cultivated principally in the islands of the Volga delta, and brought into commerce in the rough condition through Astrachan to Moscow and St. Petersburg, is now also cultivated on a large scale in the neighbourhood of Batoum. Although until the last few years the occurrence of liquorice in this district had hardly been observed, at present this article constitutes there one of the most important articles of export. The principal place of production is Liakha, in the district of Elisabethopol, from whence in the course of the year 1887 a quantity of about 1400 tons was brought to Batoum.

* * *

The sale of alcoholic liquors, under various disguises, to men and women of bibulous proclivities who are baulked of their drink by the law or by the pressure of public opinion, has lately led to the prosecution of a Massachusetts grocer. The liquor called "ginger" was shown to contain a large amount of spirit, and the husband of one purchaser had warned the grocer not to sell it to his wife. The defendant urged that he sold it as medicine without knowing that it was intoxicating, but the court ruled that it was not of any consequence whether he knew its intoxicating quality or not and that he was liable for a violation of the law prohibiting the sale of alcoholic liquors without a licence. The jury, however, were unable to agree on a verdict and were eventually discharged.

* * *

Our American contemporary, the *Western Druggist*, in speaking of the adulteration of food products, says that in the United States the practice is rapidly assuming proportions which will demand serious attention from the Government, but that a very difficult factor in the problem is that relating to analytical examinations, because the average American chemist is notoriously incompetent to carry out the examination of organic substances. Some also certify according to the way they are paid or otherwise influenced, while medical college professors, having no knowledge of the technical processes involved in the manufacture of drugs or medicinal preparations, do more harm than good by acting as "chemical experts." For these reasons it is urged that only those thoroughly familiar with drugs, etc., and with the method of preparation, ought to be entrusted with the work of analysis in cases of suspected adulteration, and that pharmacists ought properly to be the men from whose ranks the food analysts should be drawn.

* * *

The next meeting of the School of Pharmacy Students' Association will be held on Thursday, Feb. 7, and will include "Notes on Mercurous Iodide," by Mr. W. Allen; "On Alums," by Mr. J. B. Thornley, and a Report on Organic Chemistry, by Mr. A. C. Stark.

* * *

At the next meeting of the Chemical Society, on Thursday, February 7, papers will be read entitled "Researches on the Constitution of Azo- and Diazo- Derivatives," by R. Meldola and G. T. Morgan; "Résumé of Researches on the Laws of Substitution in the Naphthalene Series," by H. E. Armstrong; "The Action of Nitric Acid on Anthracene," by A. G. Perkin, and a "Note on Methyl Fluoride," by N. Collie.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN EDINBURGH.

January 16, 17, 22, 23 *and* 24, 1889.

Present on the 16th and 17th—Messrs. Clark, Dott, Gibson, Gilmour, Kinninmont, Maben, Nesbit and Stephenson.

Present on the 22nd, 23rd and 24th—Mr. Carteighe, President; Messrs. Clark, Dott, Gibson, Gilmour, Kinninmont, Maben, Nesbit and Stephenson.

Professor Sir Douglas Maclagan was also present on the 16th, 17th, 23rd and 24th, on behalf of the Privy Council.

MAJOR EXAMINATION.

16*th.*—*Two* candidates were examined. *Both* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Clague, Thomas Maltby.....Douglas.
Clark, James.....Buxburn.

MINOR EXAMINATION.

16*th.*—*Ten* candidates were examined. *Three* failed. The undermentioned *seven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Ainsworth, Benjamin.....Blackburn.
Aitken, Thomas Gebbie.....Kilmarnock.
Alexander, William Maxwell...Dundee.
Brown, James Joseph .....Perth.
Carrie, Robert Smith .....Kirkcaldy.
Clark, Alexander John .....Grantown-on-Spey.
Davidson, James.....Gateshead.

17*th.*—*Twelve* candidates were examined. *Five* failed. The undermentioned *seven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Dinwoodie, James Herbert ...Lochmaben.
Donald, Andrew .....Port Glasgow.
Foster, Edgar Denney .....Rugby.
Gray, John Johnston .....Banchory Devenick.
Grimshaw, William Henry ...Blackburn.
Harper, William .....Turriff.
Harrison, Thomas Henry .....Greenock.

22*nd.*—*Twelve* candidates were examined. *Four* failed. The undermentioned *eight* passed, and were declared qualified to be registered as Chemists and Druggists:—

Hartill, Ambrose.....Lower Gornal.
Henderson, Hy. Alfred Warburton. Wibsey.
Ireland, William Ramage .....Galashiels.
Jewell, Alfred Furniss .....Grantham.
Johnstone, William Graham...Lochmaben.
Kennedy, Alexander .....Glasgow.
Lamont, William.....Forfar.
MacAulay, Donald .....Inverness.

23*rd.*—*Twelve* candidates were examined. *Four* failed. The undermentioned *eight* passed, and were declared qualified to be registered as Chemists and Druggists:—

McIvor, Robert Alexander ...Chirnside.
McKay, James Alexander.....Dufftown.
Mackenzie, Stewart Murdoch..Musselburgh.
MacLeod, Lewis .....Inverness.
Macpherson, William.....Dufftown.
Noak, Walter Frederick.....Droitwich.
Ogg, George.....Buxburn.
Owen, Robert Godfrey .....Liverpool.

24*th.*—*Eleven* candidates were examined. *Three* failed. The undermentioned *eight* passed, and were declared qualified to be registered as Chemists and Druggists:—

Robertson, David Stewart.....Rutherglen.
Robertson, William George ...Jedburgh.
Smith, William John .....Newcastle-on-Tyne.
Smith, William Murray.....Edinburgh.
Stewart, Alexander Reid .....Hamilton.
Stewart, Alexander Stephenson Edinburgh.
Whitelaw, Andrew .....Greenock.
Whitfield, Allison .....Sunderland.

MODIFIED EXAMINATION.

24*th.*—The undermentioned was examined, and was declared qualified to be registered as a Chemist and Druggist:—

Hodge, John.....Dundee.

PRELIMINARY EXAMINATION.

A meeting of the Board of Examiners for England and Wales was held on Friday, January 25, 1889.

Certificates by approved examining boards were received from the undermentioned in lieu of the Society's examination:—

Banks, Edwd. Herbert Hardy. Falmouth.
Bush, William Henry.....London.
Clegg, Alfred Joseph .....Wantage.
Scott, James Hugill .....Penrith.
Steele, Bertram Dillon .....Weston-Super-Mare.

The Report of the College of Preceptors on the Examination held on January 8 was received.

Three hundred and fifteen candidates had presented themselves for examination, of whom *one hundred and fifty-nine* had failed.

The following *one hundred and fifty-six* passed, and the Registrar was authorized to place their names upon the Register of Apprentices or Students:—

Adams, Thomas Gallon .....Newcastle-on-Tyne.
Allen, Samuel Joseph.....Leicester.
Anstey, Samuel .....London.
Armitage, Thomas ... .New Shildon.
Armstrong, Thomas .....Bridge-of-Allan.
Atkin, Royal Hy. Albert .....Morecambe.
Beaton, Edward .....Dufftown.
Belcher, Arthur John.....Birmingham.
Benjamin, Joseph .....Ystrad Meurig.
Bentley, John Thomas ....Cullingworth.
Besley, Edward Charles .....Exeter.
Bienvenu, Sydney George.....Andover.
Blakeley, Leonard .....Otley.
Blakey, George .....Gateshead.
Bostock, John .....Wrexham.
Boyd, Arthur Millne .. ..Leicester.
Boyce, Herbert George .....Downham Market.
Bridges, Herbert.....Norwich.
Brummitt, Arthur .....Dewsbury.
Bugden, Arthur .....Bicester.
Bunting, William Henry .....Ryton-on-Tyne.
Calvert, John .....Bradford.
Campbell, John .....Kilcreggan.
Campkin, Bernhard Sidney ...Cambridge.
Carmichael, John .....Kinross.
Carr, Edward Launcelot .....Cambridge.
Chalmers, George .....Huntly.
Clark, Peter Skinner .....St. Andrews.
Clark, Sydney .....Bury St. Edmunds.
Clarke, Arthur Ernest .....Croydon.
Clement, Howell Edwin .....Plymouth.
Collett, Archd. Rd. Matthews ..Gloucester.
Coupland, Arthur .....Buxton.
Coward, Miles.....Keswick.
Cowley, Thos. Norbert B.....Ross.
Cross, Herbert Francis .....Cambridge.
Cruickshank, George .....Aberdeen.
David, Idwal .....Cardiff.
Duncan, George .....Fife-Keith.
Edward, William Lee .....Edinburgh.
Edwards, David Powell.....Bishop's Castle.
Edwards, Lewis .....Llangollen.
Fairbairn, James Hume .....Edinburgh.
Falconer, John .....Lanark.

Feltwell, John Greenwood ...London.
Fennellow, George William ...Louth.
Firth, Fred .....Wakefield.
Flood, Frank .....Woburn.
Fox, Frederick Harry.....Lincoln.
Gibson, Mary .....London.
Gillam, John Duke .....Brechin.
Gilmour, William, Junr.....Edinburgh.
Gould, Charles Norman.. .....Exeter.
Greig, Frederick Robert .....Laurencekirk.
Hackshaw, Harry Roche ..... London.
Hardman, William Robert. ....Hull.
Harris, Robert Henry.....Stoke-on-Trent.
Hewson, Thomas.....Louth.
Highton, Edwin .....Blackburn.
Horsburgh, James David .....Grange.
Howlett, Robert .....London.
Howling, Abram Edward .....Leith.
Hughes, Robert Ferguson.....Pittenween.
Hunter, Stanley .....Liverpool.
Huntsman, Charles Sidney ...London.
Ingham, James .....Cleckheaton.
Ironside, James Francis .....Aberdeen.
Jackson, Henry ....Witney.
James, Clarence Hilyer .... . .Cheltenham.
Jameson, William .....Edinburgh.
Jenkin, Arthur Henry .....Southampton.
Johnson, Alfred .....Liverpool.
Jones, Arthur Scott .....Guernsey.
Jones, Henry Elmes .....Lampeter.
Jones, Jane Ellen .....Birmingham.
Jones, J. Lloyd .....Chester.
Jones, Thomas Charles .....Connah's Quay.
Kenion, Walter .....Yeadon.
Kitching, Arthur Scott .....Beckenham.
Kitson, Edward John, junr.....Worcester.
Lakeman, Stephen .....Melksham.
Lawton, Tom .....Bournemouth.
Lee, Frank .....Rhyl.
Lyon, Harold .....Chatteris.
McDonald, William .....Inverkeithing.
Macintosh, Robert .. ..Grantown.
Main, John Alex. Allan .....Edinburgh.
Marsh, Fredk. William .....Crewkerne.
Mason, Herbert .....Wigan.
Martin, Arthur Benjamin .....Lowdham.
Maunder, Jno. Hannaford.....Teignmouth.
Miller, Arthur .....Bassenthwaite.
Moody, Douglas .....Montrose.
Morris, Sidney David.....Llanelly.
Mowat, Edward .....Edinburgh.
Neville, Robert Alfred .....Tetbury.
Nicholls, Ernest Albert .....London.
Niven, John .....Kilmarnock.
Norman, Joseph Thompson ...Cark-in-Cartmel.
Oatley, Frederick .....Chorley.
Owen, David.....Flint.
Parkinson, John .....Colne.
Parsons, Arthur .....Merthyr.
Pattinson, Thomas ....Guisborough.
Peck, Frederick .....Hedon.
Pensotti, Chas. Bernard .....Kidderminster.
Pilkington, James Edwd. .....Clayton-le-Moors.
Platt, William E.... . .....Ellesmere Port.
Price, Frederick William .....Chirk.
Price, Rhys Jones .....Llanwrtyd Wells.
Reakes, Charles John.....Wingham.
Rive, Percy .....Jersey.
Roberts, Robert Randall .....Chester.
Robinson, James Fredk.....London.
Robertson, James .....Edinburgh.
Rowell, Thomas Bell .....Newcastle-upon-Tyne.
Royston, Jno. Cornelius Wm...Hoyland.
Ruxton, James.....Arbroath.
Sclater, John George .....Edinburgh.
Sharples, William .....St. Helens.
Shaw, Thomas..... .....Wigan.
Smith, Harry .....Huddersfield.
Smith, Herbert ....Workington.
Snell, William Kennard..... ..Okehampton.
Speechly, Guy Ascelinus .....Bishop Stortford.
Spencer, William ..... Birmingham.
Stead, Charles..... .....Heckmondwike.
Stephen, George .....Huntly.
Sumpter, Arthur George .....Cambridge.
Thomas, William Oliver .....Llwynhendy.
Tomson, Stanley Edgar.....Hastings.
Tuach, William .....Inverness.
Twigg, John George .....Lincoln.
Tyack, Roland Tom.....Wells, Somerset.
Wale, Arthur .....Wallington.
Walker, John .....Buxton.
Wallace, Alex. Profeit .....Aberdeen.
Watkins, William .....Pentyrch.
Wheeldon, Richard Harold ...Marple.
White, John William .....Stony Stratford.
Whitney, Alfred ....Walsall.
Whitehead, William .....Bury.
Wilkie, Adam Laidlaw .....Galashiels.
Williams, David .....Treherbert.
Williams, Harry Griffith .....Sheffield.
Williams, Hugh Francis .....Llanfyllin.
Williams, John .....Carmarthen.
Williams, Rowland Henry ...Holyhead.
Wilson, James .....Aberdeen.
Wilson, Richard Henry.....Elton.
Wilson, William Wood .....Glasgow.
Wood, Robert .....Milton Bridge.
Woodhouse, Frederick Richd..Kirkby Lonsdale.
Woodman, Thomas .....Newcastle-upon-Tyne.
Wright, Edward .....Peterborough.
Wyper, William .....Hamilton.

The questions set at this examination were published in the *Pharmaceutical Journal* for Jan. 12, p. 558.

The following is a list of the centres at which the examination was held, showing the number of candidates at each centre and the result:—

	Candidates Examined.	Passed.	Failed.
Aberdeen	25	9	16
Birmingham	10	5	5
Brighton	3	1	2
Bristol	9	2	7
Cambridge	11	8	3
Canterbury	1	1	0
Cardiff	6	4	2
Carlisle	8	3	5
Carmarthen	10	6	4
Carnarvon	5	2	3
Cheltenham	9	4	5
Darlington	8	2	6
Dundee	6	4	2
Edinburgh	21	13	8
Exeter	15	7	8
Glasgow	12	8	4
Guernsey	1	1	0
Hull	3	2	1
Inverness	2	2	0
Jersey	2	1	1
Lancaster	4	3	1
Leeds	20	10	10
Lincoln	5	4	1
Liverpool	18	12	6
London	26	10	16
Manchester	20	9	11
Newcastle-on-T.	15	5	10
Northampton	2	2	0
Norwich	3	1	2
Nottingham	8	4	4
Oxford	3	2	1
Peterborough	4	1	3
Sheffield	7	2	5
Shrewsbury	2	2	0
Southampton	7	3	4
Truro	1	0	1
Worcester	1	1	0
York	2	0	2

The following particulars respecting this examination have been supplied by the College of Preceptors:—

Preliminary Examination.

January, 1889.

At this examination, of the 315 candidates examined 156 passed and 159 failed.

293 candidates took Cæsar.
12 ,, ,, Virgil.

Of the 159 candidates who failed,
61 failed in one subject only;
58 „ „ two subjects only;
35 „ „ three subjects.
5 obtained the required marks in each subject, but failed to secure the pass aggregate.
Of those who failed in one subject only,
16 failed in Latin;
37 „ „ Arithmetic;
8 „ „ English.
Of those who failed in two subjects only,
23 failed in Latin and Arithmetic;
8 „ „ Latin and English;
27 „ „ Arithmetic and English.

Of the 159 who failed only 15 succeeded in obtaining the required pass aggregate.

Of the 78 failures in English 16 are attributed to bad spelling.

Of the 122 candidates who failed in Arithmetic only 4 obtained the correct answer to question 1.—"Find the cost of 175 cwt. 14 lbs. 12 ozs. at £1 13*s.* 4*d.* per cwt."

Proceedings of Societies in London.

ROYAL INSTITUTION.

Meteorites and the History of Stellar Systems.

On Friday, the 25th inst., a lecture on "Meteorites and the History of Stellar Systems" was delivered by Professor G. H. Darwin. He first explained that such great advances had recently been made in celestial photography that now, by using very sensitive plates and giving an exposure of some hours' duration, photographs could be obtained showing stars too faint to be seen by the eye with the aid of the telescope. A photograph of this kind (a portion of the milky way in the constellation *cygnus*) was exhibited.

In the vast multitude of visible stars, representatives of every stage of evolution are to be found, and by means of the spectroscope it is possible to ascertain approximately their age and temperature. Coming to the question of their formation, the lecturer explained the nebula hypothesis of Laplace, which would account for the formation of planetary systems, in a very plausible manner. Assuming a mass of gaseous matter at a high temperature to be revolving round its axis in space, the form assumed by it would be that of a sphere flattened at the poles and bulging at the equator. As cooling took place on the outside it would be accompanied by condensation, and this would cause more rapid revolution, and increase the centrifugal force and consequent bulging at the equator. At a certain stage the centrifugal force at this point would overcome that of attraction, and a ring of matter would separate off at the equator and revolve outside the central nucleus. This ring on further cooling and condensation would aggregate into masses or planets revolving in orbits round the central mass, while in this still contracting central portion the same process would be repeated, giving rise to another series with smaller orbits. In this way a planetary system would be produced, revolving round a central sun.

In support of this hypothesis, the lecturer showed on a screen a very fine photograph of the nebula in Andromeda, taken for him by Mr. Roberts, and showing a central mass of more densely aggregated matter surrounded by several rings of nebulous matter which presented distinct centres of aggregation into smaller nuclei or planets; it showed just the appearance deduced from the hypothesis.

There is, however, one great obstacle in the way of the acceptance of the nebula hypothesis. Recent observations and deductions made by Lockyer, Maxwell and others, tend to prove that nebulous matter is not gaseous, but made up of solid fragments, a shower of brickbats, as it has been called, by the frequent collisions of which sufficient heat is produced to temporarily convert portions of them into vapour so hot as to be incandescent. These incandescent gases would rapidly cool, but as the collisions would be incessant, more would be continually produced. This seems totally opposed to the nebula hypothesis, as the essence of the latter is that the matter is gaseous.

The chief object of the lecture was to indicate how this theory of Lockyer's may be reconciled with the nebula theory of Laplace, which is so satisfactory in other respects.

To begin with, the lecturer explained the kinetic theory of gases, aptly comparing the colliding and rebounding molecules of a gas to the movements of a swarm of house-flies. If his audience could imagine themselves reduced to immeasurably small dimensions, the molecules of air would appear to them as so many cannon balls, rushing about in all directions with great velocity. Now returning to nebulæ, he held that these were so vast that the meteorites of which they consist, according to the theory of Lockyer, may be regarded as equivalent to the molecules of a gas.

The necessary elasticity to cause them to rebound from each other after collision would at first sight appear to be wanting in solid bodies, but the result of their impact at so enormous a speed would effect such a development of heat that portions would be volatilized into vapour possessing a high temperature, and this would have an effect similar to the explosion of a charge of gunpowder between them.

Having disposed of this difficulty, another remained, viz., the frequency of fracture; it would naturally be supposed that by all these collisions the meteorites would ultimately be all broken up into dust. This, however, would probably not be the case, for the volatilized portions on cooling would condense into a kind of rain which would fuse with previously formed meteorites, and so balance the effects of fracture. As a matter of fact many meteorites show marks of this fusion.

The lecturer then proceeded to support the possibility of his theory by figures, taking our solar system as a basis and imagining its mass to be scattered in fragments of a pound each through a sphere with a radius twice the distance of Neptune from the sun. The number of these masses would be represented by 4 with 30 ciphers after it, and he gave figures to show that the collisions between them at any distance from the centre would be sufficient to support their analogy to the molecules of a gas, and reconcile them with Laplace's hypothesis.

The formation of planets was also readily explicable, for as the meteorite masses became more crowded together in the centres of aggregation, their velocity and the length of their free paths would diminish, and as the impacts became more frequent the gases generated would not have time to cool down, and there would result a central mass surrounded by incandescent vapour. With this theory, too, many other known facts accorded, such as the presence of the large number of asteroids between the orbits of Mars and Jupiter. Other rings of similar asteroids probably existed, but not in so favourable a position for being seen, as any occurring between the orbit of Venus and the Sun would be too near the latter to be visible, while any outside the orbit of Jupiter would be at too great a distance. The Zodiacal light was very probably a reflection of the sun's light from a group of meteorites in its neighbourhood, and the showers of shooting stars which periodically visit us constitute some of the dregs of our solar system.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, January 24, Mr. F. Browne, Vice-President, in the chair.

The proceedings commenced with the reading of the following :—

Notes on Pilocarpine.

BY LEWIS OUGH.

Pure pilocarpine is a non-crystallizable soft viscous mass, very slightly soluble in water, freely dissolved by ether alcohol and chloroform. A number of its salts may be crystallized from alcohol, of which the acetate and sulphate are very deliquescent. The B.P. gives as a test for the nitrate that "strong sulphuric acid forms with it a yellowish solution, which on the addition of bichromate of potassium gradually acquires an emerald green colour." This test, of course, depends on the reduction of the bichromate to a salt of chromium, and as so very many organic substances will cause this same change, it is not to be relied on. With a hope of finding a more satisfactory reaction by which the alkaloid may be detected, the following reagents were applied (in all cases working with the nitrate). All the ordinary alkaloid reagents give a precipitate, but neither is at all characteristic.

Iodide of bismuth and potassium gives a brown precipitate.

Iodine and iodide of potassium gives a brownish-red crystalline precipitate.

Iodide of potassium and mercury gives a white precipitate.

Phosphomolybdic acid gives a yellow curdy precipitate.

Iodide of potassium and cadmium gives a white precipitate.

Nessler's solution gives a white precipitate.

Mercuric chloride gives a white precipitate readily soluble in dilute hydrochloric acid.

These reactions will take place in very dilute solutions.

Picric acid, tannic acid and platinic chloride only give precipitates in very concentrated solutions.

The following reagents give negative results :— Potash, soda, ammonia, ferric chloride, potassic iodide, potassium sulphocyanide, sodic phosphate, potassic chromate, ammonic oxalate, arsenic acid, ammonic molybdate, acetic acid, milk of lime, nitrous acid, sulphurous acid, acetate of lead, iodic acid, malic acid, mercuric nitrate in HNO_3, stannous chloride in HCl, picric acid with strong H_2SO_4, HCl or HNO_3, a mixture of HNO_3 and H_2SO_4, a mixture of sulphuric acid and ferric chloride. Oxidized with $KClO_3$ and HCl, and evaporated to dryness, the residue gives no reaction with KHO, AmHO or with strong H_2SO_4.

On consulting the published information on the subject of pilocarpine I find that Mr. Gerrard, in 1875,* states that the alkaloid dissolved in

Strong H_2SO_4 gives a brownish-black colour.
Strong HNO_3 ,, ,, faint pink ,,
Strong H_3PO_4 ,, ,, faint pink ,,

Working with the nitrate I fail to obtain these three reactions, in each case the salt dissolving to form a colourless solution. He also states that bromine neither gives a precipitate nor coloration, but I find that with bromine water a yellow precipitate is obtained very like that given with a cinchona alkaloid. A similar reaction is obtained with morphia, brucine, codeine and cocaine, but not with veratrine.

Mr. G. W. Kennedy† mentions that potassic bichromate gives a light blue precipitate soluble in H_2SO_4, but this I fail to obtain. A solution of the nitrate discharges the colour of permanganate of potassium with the formation on warming of a brown precipitate, probably a hydrated oxide of manganese. The cinchona alkaloids, morphine, veratrine, brucine and codeine also bring about this reaction, but with caffeine no precipitate is produced, whilst with cocaine a purple precipitate is obtained with this reagent.

In experimenting with the nitrate of pilocarpine I observed that in the presence of strong H_2SO_4 and phenol a fine green colour is produced, but on further investigation this was found to be due to the nitric radical and not to the pilocarpine. The test is applied as follows. A fragment of a dry nitrate is mixed with a few drops of strong H_2SO_4 and a little phenol added ; a brown colour is produced, rapidly changing to a fine green. This on dilution with about an equal bulk of water gives a pinkish colour, and if neutralized with ammonia, KHO or NaHO a dark or lighter yellow, according to the quantity of nitrate present, is produced. As I am not aware the former part of this test has been before noticed for the detection of a nitrate I give it here.

Mr. W. T. Jones then read the following :—

Note on Euonymins.

BY W. T. JONES.

As my time for the production of this note has been limited, I can only give *seriatim* the results of the examination of the two specimens handed to me by Mr. Holmes. Anything further than that I must relegate to the future.

The euonymins of commerce may be said generally to be produced by double exhaustion of the bark of *Euonymus atropurpureus* by spirit and water, the two products being mixed and evaporated to dryness. The result is then powdered and mixed with various substances, inert and otherwise, *ostensibly* for the purpose of mitigating the effect of its hygroscopic nature, although the fact that this at the same time lessens the cost of production is, I fear, no mean consideration. Judging from the published results of previous examinations and from those I have myself made, it would appear that the process of manufacture must be materially modified by the different makers, for while some samples yield as much as 73 per cent. of their weight to spirit, others yield as little as 12 per cent. Those that yield such high percentages are probably prepared by precipitating an alcoholic percolate with water. The various ashes again occupy the broad range of 11 to 53 per cent.

The normal constituents of the drug are probably an uncrystallizable body, euonymin, asparagin, euonic acid, which crystallizes in needles, and various resins. The adulterations are too numerous to mention. In one specimen I have, barium carbonate is present, an adulterant which, from point of weight, leaves nothing to be desired on the part of the manufacturer, although it would scarcely be approved by the prescriber. The two specimens I examined both gave large precipitates of aluminium, which had probably been originally introduced as alumina.

The green specimen, under the microscope, gave no evidence of lycopodium or vegetable tissue. Treated with water it reduced Fehling's solution. When percolated with spirit only 12 per cent. was dissolved. Water, however, extracted 36 per cent. On incineration it yielded an ash corresponding to 49 per cent. of its original weight. Of this 12·5 per cent. was soluble in water and consisted chiefly of sulphate of potassium. The remainder consisted of alumina 31·5 per cent., and ferric oxide 5 per cent. As the residue, after treatment with spirit, water and dilute hydrochloric acid successively, was of a dull greenish-blue colour, Prussian blue was suspected as a colouring agent. On treating with ammonia a precipitate of ferric hydrate was obtained, and the filtrate gave the ferrocyanide test with ferric chloride, which proved the suspicion correct. Presuming all the ferric oxide obtained from the ash to have originally existed as Prussian blue, it

* *Pharm. Journ.*, vol. vi., page 227.
† Amer. Pharm. Assoc., 1881, page 424.

would amount to 8 per cent. of the whole. The remainder of the colouring matter was chlorophyll, as evidenced by the absorption spectrum of an alcoholic solution and by its other physical and chemical properties. I treated for sap green, by the addition of a small quantity of water to a few grains of the powder, and the application of tests for calcium, but failed to find any.

Turning now to the other specimen, the brown, it will be seen that the chief points in which it differs from the green are (1) its yield of ash, which is only 11·7 as compared with 49 per cent. and (2) its colour, which is partly due to the absence of artificial colouring matter, and perhaps partly to its having been dried at a temperature above 60° C., which has destroyed the green of the chlorophyll. Under the microscope, it gave no evidence of lycopodium. When treated with water, it reduced Fehling's solution. It yielded a greater proportion of its weight to spirit than the green, viz., 22·5 per cent., but rather less to water, viz., 31 per cent. The residue, after percolation with spirit and water, revealed under the microscope a considerable amount of vegetable tissue, which got there probably as powdered euonymus bark. The ash obtained in this case (which, as mentioned above was 11·7 per cent.) contained a trace of ferric iron, and a large amount of aluminium, the original nature of which was probably the same as in the green specimen. It also contained sodium and potassium salts. The following is a *résumé* of the foregoing details:—

Colour.	Dissolved by spirit. Per cent.	Dissolved by water. Per cent.	Ash. Per cent.	Adulterations.
Green . .	12	36	49·1	Alumina. Prussian blue. Sulphate of Potassium Sugar of Milk.
Brown . .	22·5	31	11·7	Alumina. Veget. tissue. Sugar of Milk.

As to the physiological action of euonymin, it seems to be a case of *tot homines tot sententiæ*, a diversity which I shall not attempt to summarise. However, there can be no doubt that its action is primarily purgative, but beyond that all seems doubt, which is not at all surprising, considering the variety of preparations met with under this comprehensive name, and that therefore probably the reports of no two medical men refer to the same thing.

A discussion followed, in which the Chairman, Secretary, Messrs. Ough, Fuge and Salter took part.

A Report on Botany, by Mr. Wyatt, was then read by the Secretary, in the author's absence. The subject was the sugar cane, *Saccharum officinale*, and the report dealt at some length with the history of the plant and its natural home. Owing to its wide range of cultivation, some difficulty has been experienced in assigning its original habitat with certainty, but it was no doubt of Asiatic origin. This is also borne out by philological evidence, the words corresponding to sugar in all the languages of Aryan origin being clearly derived from the Sanskrit "surkara" or "sakkara." The history of the plant was traced back to the seventh century, when the art of sugar-boiling was known in India in the vicinity of the Ganges. A description of the plant was then given, and its varieties enumerated, and the report concluded with descriptions of the methods employed for extracting and refining the sugar.

The report gave rise to a discussion, in which the Chairman, Secretary, Messrs. Salter, Hobbs, Pugh, Marsden, Fuller and Taylor, joined.

After some discussions on miscellaneous subjects the meeting adjourned.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of this Association was held at 103, Great Russell Street, on Thursday, January 24, Mr. E. J. Millard, President, in the chair.

The minutes of the previous meeting having been read and confirmed, and a new member proposed, the President called on the Honorary Secretary to open the proposed discussion on "Trade Protection."

The Honorary Secretary then read the following paper:—

Trade Protection: Its Present Relation to Pharmacy.

BY A. CAMPBELL STARK,
Pharmaceutical Chemist.

In treating of a subject having for its title such a comprehensive expression as that of trade protection, it is important at the outset to define exactly the construction which that expression, for present purposes, is intended to bear. It is not proposed, for instance, to attempt to adjust the relations between these much-vexed questions, fair and free trade, nor do I hold a brief for monopoly, or lead on the other side. Neither am I prepared to lay before you a scheme for the State protection of pharmaceutical interests. Such a scheme being, I am convinced, premature, and therefore useless. My object is rather to vindicate the claims of pharmacists to protection at the hands of the State; to point out the obstacles which bar the recognition of those claims, and to offer practical suggestions for their removal. The kind of protection then that I would speak of to-night would be perhaps expressed by the term recognition. The question to be considered is, whether work, the skilful performance of which is necessary to the welfare and safety of the public, shall not be placed solely in the hands of the men best qualified to perform it, and who are moreover compelled by the State to show their ability to perform it by a severe course of study and examination.

The claims of pharmacists to protection such as this would hardly seem to need vindication, yet such is the power of that panacea for commercial evils, "free trade," that men see the bugbear monopoly in every attempt to secure certain ends by the safest and most effectual means at command. Meanwhile they pander to a really dangerous monopoly, that of capital; for in all competitions where complete freedom of action is allowed, the weakest, in this case the poorest, must be eventually overcome.

The object of all wise legislation, I take it, is twofold. First, the benefit and safety of the community, and secondly, justice to the individual. Neither of these objects have been at present attained, as far as regards the subject of my paper.

The first of them, the benefit and safety of the public, is under the present system in no way provided for. The laws ostensibly made for this purpose much resemble those made by the Medes and Persians, whose constitution did not permit them to repeal an act once upon the statute-book, but allowed them to make another exactly negativing it. This is the system of legislation pursued by the British Government in these laws relating to poisons and patent medicines.

There is really something quite humorous in restricting the sale of a few poisons (which no one wants to buy) to the men most qualified to distribute them with safety, and at the same time allowing anyone who will contribute directly to the revenue to sell these and the rest in any quantity. But this indeed is characteristic of our system of governmental finance, a system which forbids the employment of spirit duty free in bond—for the protection of the revenue—and reduces the income of the country, by some annual millions, to take a penny off the income tax. It is impossible to exaggerate the dangers to which the public

is daily exposed under the law appertaining to patent medicines. The modern Romeo has no need to search the town for an apothecary, whose necessity he may pay to sell him poison, though he would, indeed, have no difficulty in finding many as needy as he of Mantua. For a duty of 1½*d.*, Romeo can procure all, and more than he needs, either for his own destruction or that of his other enemies. When the most deadly poisons and powerful remedies are at the service of anyone who can command the sum of 10½*d.*, it is indeed time that the State stepped in, and prevented the imposition of the public at the expense of health and life. Many a dangerous vice has been acquired by the ease with which narcotics can be obtained, and numberless infants have been slowly drugged to death to swell the revenue. Here then is one of the first barriers to the state protection of the pharmacist. No scheme of protection which does not forbid the sale of secret remedies and powerful poisons at the hands of unqualified persons will avail us anything. The poison schedule is already a pleasing fiction, and any further steps to restrict the sale of poisons will always be nullified by the government "implying no guarantee."

Another danger which daily threatens the safety and benefit of the community is the employment of unqualified dispensers. The law kindly permits anyone to dispense a prescription who can read it, but when two ounces of solution of strychnine are dispensed in a single draught it seems that such permission is more kind than judicious. Dispensing is undoubtedly the most important duty that the pharmacist has to perform, and upon his performance of it depends his professional status; he should endeavour therefore, by every means in his power, to restrict its practice to men most likely to perform it with credit in the eyes of the public. Upon the ability of the pharmacist to dispense rests his primary claim to protection. The second object of wise legislation, that I have mentioned, justice to the individual, has always been consistently ignored. The State insists upon a long course of study and examination before allowing the pharmacist to commence business on his own account; it will not even allow him to call himself by a recognized title until he is qualified; it then provides him with a thousand competitors not handicapped by examination, and offers him, as an inducement to further progress — exemption from serving on his country's juries. He is compelled by law to show his knowledge of a business which is entirely at the mercy of the most ignorant capitaled charlatan or advertising impostor who likes to compete with him. His preparations, the result, it may be, of the skill of generations of his kind, are snatched from under his nose, retailed by hucksters or sold at impossible prices by the stores, to the danger of the public and the destruction of his trade.

Now the most rabid protectionist does not, I assume, so much as dream of a trade monopoly. But, in truth, no such monopoly is involved in limiting to pharmacists the practice of pharmacy. The State has admitted that pharmacists must undergo a course of training and education before practising their art. If a calling requires training and education and state-enforced examination, it is but logical to assume that it cannot, in the interests of the public, be practised with safety by unqualified persons.

By the antiprotectionists, the position of the pharmacist has been, at divers times, compared to that of the members of such bodies as the Inns of Court, the Institute of Civil Engineers, and the medical profession, and from the state of these professions arguments have been adduced against the need of protection for the pharmacist. Such inapt comparisons as these are far more useful to adorn a tale than to point a moral; the difference between the position of the pharmacist, and that of the barrister, for example, is fundamental, and herein, I think, it lies. The wares retailed by the barrister are quite intangible. No man can practice with success at the Bar without a sound knowledge of law; a sound knowledge of law implies a long and arduous training, and the barrister has for rivals only those men possessing as much, or more, knowledge than himself. In a word, his success depends upon his individual merits, and he thus possesses a monopoly of the most stringent kind. The same reasoning applies with equal force to the Institute of Civil Engineers, and to the medical profession, which latter possesses also many actual monopolies, such as the granting of death certificates, the receiving of fees in a court of law, the certifying of lunatics, etc., etc. Now if we regard the position of the pharmacist we shall find it to be radically different. The pharmacist's wares are without exception tangible; all the skill and knowledge in the world will not fill his shop with customers, or enable him to earn aught but a scanty living. It is because of his anomalous position in this respect that he lays claim to some measure of protection.

I have now described, to the best of my ability, the present position of the pharmacist as regards his claims (in the abstract) to State protection. The important questions we have now to deal with are, What chance is there in the future of obtaining a monopoly of the practice of our art, and how is that monopoly to be obtained?

If we examine the evolution of one of the bodies mentioned in a preceding paragraph, to its present state, we shall find its progress marked by two distinct phases—they are those of education and recognition. It was not until some scheme of education was promoted and carried out by the College of Surgeons that they were recognized by the public as the men most fitted to practice the art of surgery with safety and efficiency; nor was it until their ability to do this was fully recognized that they received what practically amounts to protection of a stringent kind. It must, I fear, be observed of pharmacy (in this country) that the full development of education has yet to be reached, whilst the dawn of recognition is but just commencing to break. If we analyse the pharmaceutical body, we shall find it by these tests a most heterogeneous assembly. Probably not two-thirds are examined men; a large number care little about the advancement of their art, of which perhaps they know a corresponding amount; whilst the ambition of many is to succeed as tradesmen, and failing that to take refuge in invective against the Society in particular and the trade in general. Moreover a new school has arisen whose hope of salvation lies in the system of ethics known as "cutting." The claims of pharmacists to the protection of the State must rest entirely upon their ability, collectively, to practice pharmacy with greater benefit to the public than any other class, and those are very sanguine who think that a government will protect a body whose interests and ambitions are so diverse.

There are two subjects under the head of education upon which I wish especially to invite your discussion; they are the Modified examination and the registration of men in business before the Act of 1868. It is really hard to see why the fact of a man having sold drugs twenty years ago should entitle him to registration whenever he likes to pay for it. The Pharmaceutical Society has always, I think, shown itself too eager to conciliate what may be called the original trade. A more than sufficient time has elapsed for the registration of members of the old drug trade, and it is time that such anomalies as the Modified examination were abolished. But the most important point I would ask you to consider in this connection is the increment of the severity of the Preliminary examination. It should be made at least as stiff as the examination in arts of

Apothecaries Hall, not a very great increase of severity after all. Whatever may be the ultimate fate of the latent Pharmacy Acts Amendment Bill, such a concession as this could no doubt be procured by the Society from the Privy Council, without much trouble, and, as often insisted upon, its passing should be compulsory before apprenticeship. It is manifestly unfair to allow individuals to enter a calling in which they are not at all likely to succeed. The number of men who have not passed the Preliminary examination, and who are never likely to, is far greater than is supposed. Such men as these act as camp-followers to a harassed army, consuming much-needed supplies, and lowering the reputation of the main body. However is it to be expected that the Legislature will believe in the superior knowledge and ability of a class of men, many of whom have not given the proof of intelligence required from a boy by the School Board?

The present state of things offers, I know, but small encouragement to increased education, but let the sneerers at education take heed. Ignorance now-a-days means destruction, and every day brings us nearer the fulfilment of that great saying of Carlyle's, "The tools to him that can handle them."

We must not expect to get protection until the rank and file of pharmacy is elevated and unanimous. The protected pharmacist of the continent is, generally speaking, a much better educated man than his English confrère.

Let us now look at the pharmacist's position with reference to his recognition by the public as something more than an ordinary tradesman. There are few civilized countries where the social status of the pharmacist is so low as it is in England, but this is due, I believe, to their imperfect education and their lack of proper assertion.

Although I am by no means posing as the champion of the Pharmaceutical Society, it is gratifying to point out that in this connection it has done, and is doing, most excellent work, and will, I trust, convince the Pharmacopœia authorities that representative pharmacists are, after all, the most suitable men to perform the practical part of Pharmacopœial compilation. The last edition of the official guide for pharmacists was such a lamentable example of "How not to do it" that the same procedure is not likely to be repeated.

To sum up, before we can hope to obtain any kind of protection, we must I believe, pass through the preliminary stages of education and recognition. I have attempted to show that we have not yet reached the primary development of the second of these. The State, be it observed, regards the pharmacist solely as a tradesman. The official authorities on pharmacy are the medical profession, and until this anomaly is removed, and pharmacy regarded as a profession, which in the interests of the public can only be practised, in all its details, by properly qualified men, we can never hope for much protection from the State.

Meantime, we can do much to improve our position until the time for State protection is ripe, and I would especially emphasize three evils requiring redress. They are: The state of the poison laws, the preliminary examination, and the employment of unqualified managers and assistants.

I have already spoken of these in detail, but of the third of them I would draw attention to the inexplicable action of the Pharmaceutical Society, in reference to the assistants' clause in the latent Bill. To offer a protest against such an invaluable clause as this was a policy little short of suicidal, and experience has shown it to be absolutely futile.

In conclusion, I am persuaded that ultimately some measure of protection will be granted to the pharmacist of the future, but never, I fear, until our present condition is considerably modified. In the meantime, we can do much to hasten the progress of such a measure, and let us each take for his motto that hackneyed, but, to this case, appropriate quotation, "'Tis not in mortals to command success, but we'll do more, we'll deserve it."

The President said Mr. Stark had done good service to the Association in introducing the subject of trade protection in such an admirable manner. In a simple but cogent style, the advantages and disadvantages of a protected state of pharmacy had been put before them, and special praise was due, as there had been no painting of arguments in lurid colours for the purpose of effect. He was under the impression that they were all more or less dissatisfied with the present state of pharmacy, although they might possibly disagree as to the means of remedying this. They were all disappointed at the slow public recognition of the advancement of pharmacy; they were disappointed at the terrible inanition of the members of the craft and at the painful progress of pharmaceutical reforms. The object of such a discussion was to compare their opinions upon a vast and important subject, and to rub off the projecting angles, which, perhaps, represented so many impossibilities or absolute disadvantages, from any scheme for more adequate protection. Referring to the cause of the present unsatisfactory state of pharmacy he coincided with the general opinion that it was due to the transitional phase of pharmacy. They had risen somewhat from the drug monger and grocer combination of the preceding century, but, he supposed, had not arrived at the elect and evolved pharmacist of the future. Moreover, they had suffered from the glorious privilege of perfect freedom of the subject; for the principle of *caveat emptor* was particularly congenial to British institutions. Now, whilst there was much that was good in this trait of our political life, it was sheer mockery when applied to medicines. His credal basis consisted in the belief that the Pharmacy Acts were only the beginning of their recognition, imperfect necessarily from their being first steps, and they should and must be followed up by further efforts in the same direction. That the treatment of the subject of poisons, by government succeeding government, was positively shameful, the subject having been repeatedly shelved, in spite of pledges that it should be dealt with. An increased schedule of poisons might perhaps be obtained, and it seemed to him that this was the best lever for obtaining further trade protection. It would be no great step from a largely increased poison schedule to the principle which Professor Attfield had enunciated, that all drugs were more or less poisons and therefore their sale should be restricted. That dispensing of physicians' prescriptions should be only in their hands everyone would admit. He was not sure, however, it would be wise to attempt to wrest it altogether from the hands of the doctors, but rather to show them that they were better served and the patient also by acknowledging and obtaining the special ability and help of the pharmacist. The subject of "patent" medicines was a crying evil, and something must be done, sooner or later, to stem the torrent of poisonous drugs obtainable from every source under the "no government guarantee." Another Mr. Wharton must be found to bring the subject persistently before the notice of the Government of the day and the public. He would urge upon them that pusillanimous vituperation of the policy of the Pharmaceutical Society would in no way mend matters. Few of those who joined in open bickering were thoroughly aware how powerless the Society is to move in this matter; and, on the other hand, how powerful, nay, irresistible, it would be if it were, as it should be, the living embodiment and voice of the whole trade. They had supported the policy of the Council again and again, and the present Bill before Parliament met with their cordial sym-

pathy because they believed that education must precede protection. If the whole body of chemists were only united they might accomplish much, but if only the younger order of pharmacists would put their shoulders to the wheel they might yet look forward to the time when a full measure of prosperity should greet all who claim pharmacy as their calling.

Mr. W. G. Blackham said that he was not surprised to hear an official of this Association supporting the policy of the Pharmaceutical Society. That Society had not, he maintained, the confidence of the trade, and, as statistics showed, it was losing its support. Its cry was, that it was powerless to do anything, and yet they were asked to support a powerless body. Mr. Stark had advocated the increased stringency of the Preliminary examination as an aid to protection; he thought the examinations were, if anything, too hard at present, and did not see how making one of them harder could help them. Mr. Stark had also said that education must precede protection. He (Mr. Blackham) maintained that they should go hand in hand. He was sorry that the author of the paper had not proposed some formal scheme for protection, and did not at all agree with him that it would be premature. He did not see that restricting the sale of patent medicines to chemists would avail them much.

Mr. T. A. Ellwood said that trade protection for the pharmacist must be viewed in a two-fold aspect; first, protection from without, and secondly, protection from within. In referring to protection from without, he specially meant Parliamentary legislation. Did they expect any monopoly over other trades? No! Did they expect the strong hand of the law to environ them around and protect them against the attacks of legitimate competition? Certainly not! The law recognizes the fact that certain deadly poisons must not be carelessly spread throughout the land by injudicious persons; it allows that the public need protection from unscrupulous vendors of these poisons, and therefore enforces an examination in order that the public may know that certain individuals are qualified to sell these several articles. He asked, is the examination only intended to test the competency of men to sell these few scheduled articles only? If so, why not confine the examination to the schedule only? He maintained that since the law requires knowledge surpassing that of these few drugs, it in spirit recognizes that the public require a further protection, and as they are protected at an enormous expense to pharmacists collectively, pharmacists in return expect, and ought to receive some measure of protection at the public expense. He did not at all think that limitation of the number of pharmacists would be a panacea for all the woes. This country is free, and competition is good for all, and he would say, let every *fully qualified man* have a business if he wishes. Neither did he think that a legally enforced price-list would avail in any thing; neighbourhoods vary so considerably, that what is a small sum in one part is a fortune in another. They wanted an extended poison schedule and a protection from a three-halfpenny licence to kill. He further maintained that no establishment should be under an unqualified manager, and that all proprietors of branch establishments should have printed on their labels the name of the qualified manager, as in the case of co-operative stores, this manager being in reality the vendor of the drug, whilst perhaps the proprietor may be miles away. Protection for the wholesale part of the business from imported articles, chiefly from Germany, was also necessary. Everything should be fair for the home producers, who pay the rates and taxes to this country. He affirmed that there were many foreign manufacturers earning a large income from sales to the English public, who could carry on their business with an office or a single room, who paid no income or other tax to the British Government. Let every foreigner in this country manufacture as he wished. But such articles as require exciseable productions in their manufacture at home should have an import duty equivalent to that paid by our own manufacturers to the excise. Our English firms would then be able to compete successfully, and would fill the chemical market with reliable preparations. Dispensing should, in all cases, be in the hands of the pharmacist, he being the only qualified dispenser. Medical men are not qualified dispensers, and, as a rule, they found them totally ignorant of the art. They could, however, obtain *this* protection of their craft from within itself. Doctors do not, as a rule, like dispensing, and it is only a continued custom that still keeps them at it. The medical man and the pharmacist should work in harmony, and in poorer neighbourhoods, by agreement between themselves, the dispensing could still be in the hands of the pharmacist without in the least injuring the doctor. Their protection from within would be to fit themselves for the position they hold, and thus inspire the medical profession and the public with a confidence in them.

Mr. T. S. Dymond said that he considered the title of Mr. Stark's paper a misnomer. There did not seem to him to be much about trade protection in it. As to the question of the "foreign invasion," it was absurd, he maintained, to speak of taxing the foreigner, nor did he think that in these days of free trade any government would listen to proposals to tax their manufactures. The public went to the Germans for chemicals because they were cheaper, and it must be admitted that the German chemists were superior to their own. As to the limitation by the State of the number of chemists, this was a free country, and he did not believe that Englishmen would ever stand that kind of thing. Nor did it seem to him at all necessary. As to the subject of the stores, they were originally formed with the view of supplying goods to members at a cheaper rate by co-operation in buying, and this seemed to him quite just and reasonable. Nor did he think that the stores had done so much harm to chemists, as had been often said. "Cutting" began before the stores commenced. He doubted whether any government would be found to listen to the plea for protection for pharmacists, and protection must come, he maintained, from within. As to the attacks on the Pharmaceutical Society, the executive was composed of the most representative pharmacists in the land, men of great experience and ability, and he, for one, was content to leave the political progress of pharmacy in their hands.

Mr. E. Richards could not remain silent on so important a subject, and as to the remarks of the last speaker (Mr. Dymond), with all due respect, he could not agree with him, "that we should buy our chemicals from the Germans" simply because they are cheaper; and he would like to ask him whether this was also a guarantee as to their purity. Nor could he agree with him "that Germans are the best chemists." He felt sure that most of them would coincide with him, that in England they had some of the first chemists of the day. Men who have made their whole life a study of original research. Referring to Mr. Stark's valuable paper, the subject was "trade protection." How were they to obtain this end if they allowed foreigners to annually come over in their thousands and escape contributing towards the national exchequer? At present they paid nothing, but pushed themselves forward, ousting out our own countrymen, existed on wages that John Bull would starve on, smoked cigars and drank lager beer, whilst Englishmen looked calmly on. He would ask, how were they in England to compete with the foreigner when they took into consideration the heavy spirit duties with which they had to contend, and also the heavy rates and taxes, from which the foreigner was exempt; also

all their manufactures were sent into this country free through agencies (*i.e.*, German). To tax the foreigner would be contrary to the free trade of this country, but why not make the foreigner contribute towards the State? He did not, as an Englishman, object to enterprise, but he thought it was but fair that foreigners or their agents should pay for the privileges, and also for the fair field and no favour which Englands affords them. As regarded patent medicines, why should those that contain scheduled poisons be sold by others than chemists simply because they bear a Government stamp? This was looked upon as a kind of protection, and they were sold by incompetent persons—grocers, drapers and others, who had not the slightest knowledge of their contents, nor did they care. These poisons were sold daily by unqualified persons, the difference being that the properly qualified chemist had no protection, and was not allowed, except under great restrictions, to retail poisons, whereas under the cloak of a Government stamp the most deadly poisons were sold.

Mr. F. Ashley Rogers was entirely in harmony with Mr. Stark's views anent trade protection, which term he preferred to that of "recognition." They did not merely wish to be recognized by the Government, the medical profession and the public, but to be protected in the interest of the public good, for he did not believe that free trade in drugs was at all conducive to the welfare of the general public. He would ask for the absolute monopoly of the sale of all drugs, and all chemicals which are used only as medicines, in any shape or form, to be granted to those only who at present have the sale of but a very small number of poisons as a monopoly. It had been suggested as a means of protecting the trade that the number of chemists should be limited by the Government, as was the case on the continent; this was one of the least desirable plans for the protection of their trade. Fair competition would never be suppressed in Great Britain. "Cutting," a word now very well understood, which had been aptly described as the sacrifice of everything for the sake of cheapness, was most to be deprecated in the interests of the public when it was applied to the sale of drugs and chemicals for medicinal use, where quality and not quantity was the desideratum. Regarding, then, the protection of the trade as a most desirable thing, he would respectfully suggest as means to that end that they increased the number of subjects required at the Preliminary examination; that the Modified examination be abolished; that it be made illegal for unqualified persons to dispense, and that they should endeavour to obtain direct representation in Parliament.

Mr. G. W. Phillips said that the real evil from which pharmacists were suffering was that they were placed in an anomalous position. The truth was that the trade which they had relied upon hitherto, in sundries, etc., which formed by far the greater part of their business, did not belong to them. It was now being diverted to the legitimate channels, and hence the pharmacist had to suffer. Now what would happen in the future, he considered, would be this: The whole of the trade in such articles as sponges, etc., upon which the pharmacist had hitherto relied for a living, would be taken away. Many of the present race of chemists and druggists would disappear, and there would be left a few (necessarily a few, because the demand was so small) of the real pharmacists, who only dispensed and sold nothing but drugs and chemicals, and these would get protection. As to the taxation of the Germans, etc., that was ridiculous. If other countries should retaliate more Englishmen would be returned upon our hands than we should care to have. There were probably more Englishmen in Germany than Germans in England, and he believed in free trade as the soundest commercial policy.

Mr. F. Alfred Rogers said that after much beating about the bush the real fact of the matter had been stated by the last speaker. He agreed with him that the basis of protection was the practice of pharmacy pure and simple, and on this basis all claims to recognition at the hands of the State must be based.

Mr. Millhouse regretted that he was unable to be present in time to hear Mr. Stark's paper, and the remarks of the President, both of whom he felt confident would treat the subject in a practical manner. He quite agreed with the last speaker (Mr. Rogers) in saying that the discussion had resulted in a great deal of beating about the bush. In his opinion only one gentleman had discussed the matter from its proper standpoint, viz., the dispensing of prescriptions and the sale of drugs, which comprised the only legitimate part of a pharmacist's business, and were all he had any right to ask or expect protection in. He thought they were perfectly justified in asking to be protected from all poachers on these fields of true pharmacy. It appeared to him to be contrary to all the dictates of common sense, that the authorities that are should say, "It is absolutely essential for the public safety that you should be compelled to pass stringent examinations, but it is not by any means essential for the public safety that you specially educated and examined men should be the only persons from whom they can procure patent drugs, and get intricate prescriptions dispensed." Whilst he agreed that sundries and patent medicines were not within the sphere of legitimate pharmacy, he did not by any means coincide with those who had during the occasion said, "discard them altogether, have nothing whatever to do with them;" for while as educated individuals they were compelled to look upon the sale of patent medicines with a scornful eye, yet as trained men of business they knew it was essential to oblige their customers. He was convinced that pharmacists, as well as their assistants, had to no small extent themselves to blame, for the present state of affairs, as regarded the sale of proprietary articles. Many amongst their ranks, who were, from a scientific point of view, good pharmacists, were sadly deficient in business capacity. Hence, when they might frequently benefit themselves, their customers, and the trade they follow, by demonstrating to them their inability to recommend the use of secret remedies (which of course requires tact), they had and still do pronounce favourable opinions upon articles about which they know nothing. This want of business capacity was, in his opinion, remarkably apparent amongst pharmacists. He was not at all surprised to hear, from the remarks of some gentlemen present, that certain manufacturing chemists wished to cripple the enterprising German chemist, but he ventured to say that this was not the spirit in which England as a nation would treat foreign competition, and it was not the spirit in which he should like to see it treated. He expressed his regret to find that there were always some among their ranks who grasped every opportunity of throwing dirt at the Pharmaceutical Society. He was not one of those who considered that it did all that one could wish it to do, but he did think it did all in its power to promote their welfare, and if those who were foremost in ridiculing its usefulness, would, instead of standing aloof, join its ranks, and give the members of its Council the benefit of their opinions and of their valuable assistance, he was sure it would be able to accomplish still more.

Mr. A. H. Mason said that he had been attracted to the discussion by seeing the title of the paper, "Trade Protection," in a free country. Notwithstanding the remarks about the evils the chemical trade suffered from, it must be remembered that the value of chemicals exported was considerably in excess of those imported. Almost the whole of the alkali, for instance, used in America was imported from the old country.

As to the question of German competition he was inclined to lay a good deal of the complaint down to some defect in English manufactures. Notwithstanding that a duty had been placed upon chloral by the British Government they still could not make chloral in England.

Mr. A. C. Stark, in rising to reply to the remarks made, said that he felt himself placed in an awkward position. The paper he had read was not intended to be an expression of his own opinion, it was simply an attempt to show the evidence in favour of the claims of pharmacists to protection, to point to the probabilities of their getting it, and to form a basis for the evening's discussion. As to his real personal opinion, his opinion of what *should* be, had been admirably demonstrated by Mr. Ellwood, while his opinion of what *would* be, had been stated with equal clearness by Mr. Phillips. Indeed he had, he believed, been the first to promulgate these views in a paper read before the Association last session. He did not feel called upon to answer his critics in detail, but he should like to reply to one or two of the questions raised. As to Mr. Blackham's remarks, Mr. Blackham reminded him of the tale that is told of an Irishman, who went to America, and the first remark he made was, "What's your government, cos I'm agin it"? Now that was exactly the position, taken up by men holding Mr. Blackham's position. They were apparently on some obscure principle "agin" everything that the Society supported. Mr. Blackham had said that the Society was powerless, and therefore should not be supported. The very reason it was powerless was because it was so inadequately supported. A society of 2000 people could not help much a community of 13,000. As to the increasing of the Preliminary examination the reason that he (Mr. Stark) advocated that was, because so many men entered the calling who were not fit for that or for any calling requiring unusual intelligence, and it was both unfair to these individuals and to the trade in general that they should be allowed to hamper progress by their connection with it. Mr. Blackham had made the extraordinary assertion that education and protection should go hand in hand. On that principle a body of students might ask for registration as medical men on the ground that they were educating themselves for doctors. He now wished to reply to Mr. Dymond's remarks. Mr. Dymond had said that German chemists were superior to their own. While admitting that, he should like to point out that the reason for this was that they had a state protected, and state aided system of education, and a most rigid system of protection. Yet Mr. Dymond said, further on, that we were a free people who would not stand this kind of thing. It was surely illogical to admire the result and yet depreciate the cause. Again, Mr. Dymond had stated a fair argument for the stores. Now while admitting the justice of them, from this point of view he (Mr. Stark) still thought that when a body of men combined together, with a large capital, to undersell small traders, at any risk, that such operations were rather a strain upon the principles of liberty. He had formulated no scheme of pharmaceutical protection, because, for the reasons mentioned, he believed such a scheme to be premature. As to the question of Germans and other foreigners being taxed, that was supremely absurd; every effort should be made to hasten the entire acceptation of free trade principles by the whole world. The number of Englishmen returned on our hand in the case of an expulsion of them from abroad, would certainly not do much to lessen competition. In conclusion, he thanked the members of the Association for the kind way in which they had received his paper, and felt himself more than repaid by the full and lively discussion which had followed it.

The proceedings then terminated.

Review.

OUTLINES OF QUALITATIVE ANALYSIS. By A. HUMBOLDT SEXTON, F.I.C., F.C.S., F.R.S.E., Professor of Metallurgy in the Glasgow and West of Scotland Technical College.*

The aim of the author has been to steer a middle course between the larger manuals of chemistry and the small books designed only to cover the syllabus of particular examinations, and accordingly to produce a work sufficiently concise for use by students with a limited amount of time, but at the same time sufficiently complete to serve for chemical students in general. In this he has succeeded very well, the outcome of his endeavours being a book of less than two hundred pages, but containing a full course of analytical and a considerable number of synthetical operations, which, if properly carried out, should give a good knowledge of qualitative inorganic analysis.

The general arrangement of the matter presents no special features, following the lines of previous works on the subject. The opening portion is devoted to experiments on fitting up apparatus, solution, precipitation, distillation, etc., and contains about sixty varied operations. This is followed by a series of blowpipe reactions, and then, a knowledge of methods and manipulation having been gained, the reactions for all the ordinary bases and acids are performed. Finally come directions and tables for the analysis of unknown substances. Tests for a few alkaloids and other organic substances are also given, but the list of these is small, although that of the organic acids is very complete.

Before giving the tests for each metal, a few words are said as to its properties, etc., and we may observe that calcium is described as being a "rare" metal. Of course it is rare to see it in the metallic state, but this is hardly the sense in which the expression is generally used, and in the usual signification of the term, calcium would be almost the commonest of the whole list. In another place the manganates and permanganates are styled a series of unimportant salts, but this will scarcely be the general opinion of them.

There are a few small points to which we might take exception, such as the description of Cl_2O_4 as a "greenish-yellow" gas, the directions to fuse PbS with Na_2CO_3 on platinum foil, the statement that $PbCrO_4$ is insoluble in NaHO, or that CoS is not precipitated by H_2S in presence of free acetic acid. As a matter of fact, cobalt is frequently separated from manganese by precipitation with H_2S in a solution made slightly acid with acetic acid, although if the acid be in very large excess the author's statement holds good to a certain extent, and little or no *immediate* precipitation occurs, although even then it is all thrown down after a time. Again, an aqueous solution of sodium arseniate is directed to be exactly neutralized with NH_4OH before adding ammonio-silver nitrate.

Many very good drawings are given of the apparatus suitable for various operations, some of the adaptations in this respect being decidedly ingenious. The questions at the end of each section are such as to develop the reasoning faculties as well as exercise the memory, although some of them go rather beyond the information given in the text. The use of the metric system of weights and measures throughout is also a distinct advance, and is not confined to measures of capacity and weights, but is used also to indicate lengths, *e.g.*, "a glass rod about 1·5 dm. long." Although containing nothing very novel, its concise arrangement, and yet thorough completeness, make it a very useful book.

* London: Charles Griffin and Co., 1888. Crown 8vo pp. i–xv., 1–176.

Parliamentary and Law Proceedings.

Poisoning by Opium.

An inquest was held at Birkenhead on Wednesday, touching the death of Miss Lucy Morriner, who died from opium poisoning. It was stated that she was in the habit of taking opium and chloral to relieve pain and produce sleep. The day before her death she went to a chemist with a prescription and procured a large quantity of the sedative, nearly the whole of which she swallowed, being afterwards found dead in bed.—*Morning Post.*

Correspondence.

Coca Leaves.

Sir,—I notice your remarks based upon a short paper introducing some of the exhibits that were made at the Linnean Society meeting of December 20, relating to the coca plants of different varieties by Mr. D. Morris, of Kew. I had to differ from Mr. Morris in many particulars. He brought forward a plant which he wished to name "*novo-granatense*," and a quantity of leaves collected from different sources, and stated that the plant with the largest leaf known existed in Paris, and was the only known specimen in Europe. I promised to send him specimens from some of my plants at Sydenham, as I had there four distinct varieties, and as the trees were large it was quite easy to see the difference in the habit, growth, and size of the leaf. I sent him the specimens, and he replied on December 31, as follows:—

"I have to thank you for the specimens of coca which arrived while I was away last week.

"I should say that No. 1 comes nearest to the Huanuco leaves, and to the plant in Ceylon, which yielded such good results in crystallizable cocaine. No. 2 is apparently the variety I have just described under the name of '*novo-granatense.*'

"No. 3 comes near, but is not quite identical with the Bolivian type. It approaches more than any other to the leaves of the plant received from Dr. Treub, from the Botanical Gardens at Java.

"No. 4 is a very well-marked plant, and appears to be the one figured by Ruiz and Pavon. These leaves I have not noticed before.

"We should be glad of a cutting or plant of Nos. 1 and 4 if you could spare them.

(Signed) D. Morris."

As Mr. Morris attached great importance to the yield of cocaine, and got Mr. Ernest Howard to support him in his opinion, I stated that in regard to the variety of coca leaves shown being the largest in Europe, even my largest variety of leaf in no way compared in size to the leaves which yield the largest amount of cocaine that come from Brazil, and which were certainly 3 to 4 inches long.

I referred to Mr. Howard, who was in the room, and he admitted at once that the fact of his having tested these large leaves had entirely slipped his memory. He believed that they could find some of these specimens at their works. This variety is certainly the richest, but we have never seen but the one shipment of Brazilian leaves of this size.

Mr. Morris further put forward the great value of the Java variety, the details of which you give in your Journal. It was a singular coincidence that the very day Mr. Morris made these remarks at the Linnean Society, a quantity of Java coca leaves were offered in Mincing Lane, and the highest bid for them was $2\frac{1}{2}d.$ per pound.

I am informed that they cannot get this leaf in its natural form, as it is so brittle that it breaks up into almost powder. Some of the similar shipment of these leaves fetched $7d.$ per pound, but there is much remaining unsold.

In regard to the variety of coca leaves from the U. S. Columbia, I mentioned that there were two or three varieties that came from that part of the world, and some that had been tested by Messrs. Howards and Sons, of Stratford, when cocaine was worth 20*s.* per gram, which were entirely neglected for their value of yielding cocaine.

I would call your attention to page 68, No. 9, 'New Commercial Plants,' and you will there see that I give information and particulars of an analysis, made by Messrs. Howards and Sons, of *Erythroxylon monogyrum.*

I think it will be a great pity if Mr. Morris's conclusions go forth to the world, that one of the most valuable varieties of coca plants known at the present time is that coming from the U. S. Columbia, and is best suited for growing to yield cocaine.

In opposition to this fact I find that those druggists and the houses making preparations of wine mixed with coca find that they have made a great mistake in purchasing only the thin green leaves, and now they are asking for the Bolivian varieties, which are larger, clearer and rounder in form. Therefore it shows it is not only the flavour that medical men think necessary; they require, as do the makers of the alkaloid, the action of the cocaine in the wines they order. Thos. Christy.

"An Improved Pessary Mould."

Sir,—The report in the Journal of a paper read by me on a new pessary mould is somewhat misleading.* Finding at the last moment that there was some question of patent right, I omitted to state, as I otherwise should, that the mould shown was kindly lent me by my friend Mr. W. G. Taplin, of 91, Hampstead Road, and that since then I have received some further information as to the way he works it. The collar illustrated in Fig. 3 is of no use to facilitate the removal of pessary, though that was its original intention. Should they stick, the best way is to wrap a cloth several folds thick round them, as they slip in the warm hand, then taking hold of the pessary itself, give the cone a circular twist on its long axis, by means of the tail Fig. 1.

Mr. Taplin also thinks the mould cannot be worked well without the tail, first, because when the core and cone are put together it is necessary to steady it whilst passing down into the outer box, and it is more necessary to get it out again; secondly, when the mould is screwed into its support, it is much better to be able to push it up from below than to have to unscrew the whole thing and turn it upside down. It was made for Mr. Taplin by Messrs. Biertumpfel and Sons, candle mould makers, of Albany Street, Regent's Park, and any credit for ingenuity of construction belongs to them. They were given a cone made as proposed by Mr. E. Head Moore, and as friends of Mr. Taplin took an interest in the matter. A. Wybrant.

Paris Quadrifolia.

Sir,—I should like to endorse the opinion expressed by Mr. A. C. Stark and Mr. J. G. Tingle at the meeting of the Chemists' Assistants' Association on the 17th ult., as to four being the usual number of leaves in a whorl in this plant, which I have found in a moist shady wood at Wollaton, near Nottingham. F. Ashley Rogers.

F. A. Brown.—In one of the latest papers on the subject (*Pharm. Journ.*, March 31, 1888, p. 832), Mr. Macpherson states that in the examination of samples of deposit from old and new ipecacuanha wines he failed to recognize the presence of emetine. One portion of it, tartrate of lime, with some magnesia, he considers to be derived from the sherry, but the remainder, constituting the bulk of the non-crystalline matter, appeared to consist chiefly of a substance belonging to the pectic series, with a small proportion of fat derived from the ipecacuanha.

R. Williams.—*Schinus molle.*

E. R.—Apply to the Secretary for a copy of the pamphlet entitled "Hints to Students."

A. Forby.—We believe there is no such Journal.

"*Henricus.*"—Wanklyn's "Water Analysis," published by Trübner.

Minor.—The salary varies very much with the locality and with the qualification.

C. Bing.—See an article on "Nickel and Cobalt" in the *Pharmaceutical Journal* for Jan. 19, p. 576.

* The paper, as printed, was revised by the author.—Ed. Pharm. J.

Communications, Letters, etc., have been received from Messrs. Taplin, Millard, Van Houten, Burroughs, Wellcome and Co., Newsholme, Rogers, Hender, Dewson, Kohn.

SUGGESTION FOR AN IMPROVED CHLOROFORM LINIMENT.*

BY PETER BOA.

The chloroform liniment of the Pharmacopœia, although in frequent demand, is a preparation upon which it did not occur to me, until recently, to experiment. In preparing it I had always deviated from the official direction to the extent of dissolving the requisite camphor in the chloroform and adding olive oil, instead of using ready-made camphor liniment as the Pharmacopæia directs. This, however, was only a labour-saving expedient for obtaining the same result. In this connection it occurs to me that the method to which I have referred is worthy of the consideration of the editors of the next edition of the Pharmacopœia.

A few months ago it was represented to me that the thinness of chloroform liniment was an objection. Unlike such liniments as aconite, belladonna or opium, which are used only in small quantities, it is generally freely used. In the case in point it was used in considerable quantity, and in so using it great difficulty was experienced in keeping it on the parts where it was required. It ran away too quickly, resulting in soiled clothes, waste of liniment and aggravation to the operator.

Knowing that soft paraffin was soluble in chloroform I tried that instead of olive oil. In this way I found that I could make a nice homogeneous liniment of sufficient thickness to be smeared on with the finger. Proceeding in my usual way for the preparation of chloroform liniment I found that by using the soft paraffin in equivalent quantity, instead of the oil, I obtained a liniment which would pour easily, but was yet sufficiently thick not to run when applied. The requisite quantity, when poured on the spot where it was required, remained long enough to let it be all utilized in rubbing.

The formula which I would suggest is as follows :

Camphor	1 ounce.
Chloroform	5 fluid ounces.
Soft paraffin	a sufficiency.

Dissolve the camphor in the chloroform and add sufficient soft paraffin to produce 10 fluid ounces.

A thinner preparation can be obtained by using less soft paraffin, a thicker one by using more than the quantity given above. In the former case of course the liniment would be stronger in chloroform, in the latter weaker.

I have observed that chloroform liniment of the Pharmacopœia becomes paler in colour when kept for some time, and the oil appears to become somewhat rancid, as it smells more strongly after decoloration has occurred. An old liniment of this description is distinctly unpleasant to use. Even the newly-prepared liniment leaves an oily smell after the chloroform and camphor have evaporated, no matter how good the olive oil employed may have been.

The liniment made with soft paraffin leaves no smell whatever. For combination with other liniments, such as opium or belladonna, it is even better than the official liniment. When shaken up with it they do not separate so quickly as from the latter. This is on account of its being thicker.

The liniment for which I have suggested a formula is not so brilliant in appearance as the pharmacopœial preparation. From experience of it, however, I am convinced that in practice it is thoroughly efficient, while it possesses the advantages of being more easily applied, less wasteful, and free from any oily smell.

[*The discussion on this paper is printed on p.* 633.]

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in Edinburgh, Wednesday, January 30.

EXTRACT OF NUX VOMICA.*

BY WILLIAM DUNCAN.

All will have noticed that this standardized extract varies considerably in consistency, and soon becomes hard through loss of moisture.

When first introduced three years ago it was stated that the hygroscopic nature of the extract rendered it impossible to keep it stable, but any samples I have seen have never shown a tendency to become weaker, but rather the reverse. Of course the consistency of the extract entirely depends on the amount of alkaloid and extractive in the seeds, and its usual semi-fluid appearance points to the fact that the seeds at present in use must be very rich in alkaloid, but poor in extractive. An extract of this consistency cannot but increase in strength through loss of moisture.

To determine this point I estimated, some time ago, a sample which when purchased was stated to be of the official strength, 15 per cent. of total alkaloid. I found it to contain 14·9 per cent. The sample when received was so thin that it could be poured from the pot. It was in daily use for about six or eight weeks, and of course the pot was frequently opened. It gradually got harder, though not unmanageably so, but I have seen some samples get into that condition.

Last week it was again estimated and found to contain 15·85 per cent., indicating a loss of nearly 5 per cent. of moisture. Unfortunately I did not estimate the total moisture originally present, so that I had no means left of confirming the loss. The average amount of moisture in the extract ranges from 13 to 20 per cent., a loss of 5 per cent. is therefore not to be wondered at. The increase in alkaloidal strength is certainly not alarming, but when we consider that this extract is a standardized one, and is expected to contain 15 per cent. throughout, the question arises, could we not get a more stable preparation ? Might we not, for instance, adopt the process followed in making the abstract of the United States Pharmacopœia, namely, evaporating to dryness, powdering and adding sugar of milk, or some other inert diluent, in a quantity equivalent to the loss of weight and in moisture.

The difficulty in the way of this is the large quantity of fixed oil met with in some extracts, the result of too strong spirit being used to exhaust the seeds. The official menstruum has been selected so that most of the alkaloid, with a minimum of oil, may be extracted. That it is possible to get the extract in this condition the sample I have brought with me will show. It has 16·3 per cent. of sugar of milk added, which is equal to the amount of moisture originally present in the extract. To all

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in Edinburgh, Wednesday, January 30.

appearance it keeps well, though I have not had time to determine accurately whether or not it will absorb moisture. Should it do so, however, the small quantity absorbed could be easily driven off by heat before the tincture is made from it.

While on this subject I may draw attention to the fact that the official process for estimating this extract is faulty in one respect. It is assumed, apparently, that one washing with chloroform exhausts the alkaline solution of its alkaloids. This I have never found to be the case. I carefully followed the official method on four occasions, at temperatures ranging from 100° to 160° F., but in no instance did I find one washing successful; on the contrary, the alkaline solution was quite bitter, and on acidulating gave distinct reactions with alkaloidal precipitants. An improvement on the first stage of the official process I have found to be to wash first with 3 fluid drachms, then 2 fluid drachms, and lastly 1 fluid drachm of chloroform, and in this way total exhaustion is ensured.

[*The discussion on this paper is printed on p.* 633.]

THE AMERICAN TINCTURA QUILLAJÆ.*

BY J. RUTHERFORD HILL.

On looking over the "National Formulary of Unofficial Preparations," issued by the American Pharmaceutical Association, I was struck by the process given for the preparation of tinctura quillajæ, which is as follows :—

"Quillaja, in fine chips . . . 8 troy ounces.
Alcohol . . . . . 1 pint.
Water . . . . . enough to make 3 pints.

Place the quillaja in a suitable vessel, with *two* (2) *pints* of water, and boil for fifteen minutes, then strain and add enough water through the strainer to make the strained decoction, when cold, measure *two* (2) *pints*. Pour this into a bottle containing the alcohol, let the mixture stand twelve hours, then filter it through paper, and add enough water to the filtrate to make it measure *three* (3) *pints*."

A footnote states that each fluid drachm represents 10 grains of quillaia. This seems to imply that the process is practically perfect and that the drug is completely exhausted.

In view of the criticism on tinctura quillaia, B.P.C., communicated to an Evening Meeting of the Society last year by Mr. Boa, and from my own experience with the drug, it seemed to me that the above formula was objectionable and unscientific, on account of the liability of saponin to split up into sapogenin and glucose under the influence of heat. It also appeared to me that the method of pouring water over the marc on a strainer was somewhat rough and not calculated to ensure complete exhaustion. I have found, moreover, that quillaia can be completely exhausted by maceration and percolation with cold water, and it occurred to me that this might be substituted with advantage for the boiling and straining ordered in the first stage of the American process.

A sufficient quantity of quillaia bark (free from outer brown layer) was reduced to fine chips and mixed. From this two tinctures were made, as follows :—

A.—The quillaia, in fine chips, was packed in a percolator, macerated for twenty hours with one-third of the water, and percolated with the remainder of the water. The percolate was a pale golden yellow liquid. This was mixed with the alcohol, when it became slightly opalescent. After standing twelve hours a flocculent precipitate had settled down, leaving a transparent pale yellow liquid with a few flakes floating through it. This passed rapidly through the filter and was made up to the requisite measure with water.

B.—This tincture was made by the American process. The bark absorbs most of the water and there is apparently not much to boil with. It also froths up during the boiling and the operation must be conducted in a capacious vessel. The strained liquid, unlike the cold percolate of the previous process, was of a brownish-yellow colour and very cloudy or opalescent. This cloudiness is due, I think, to incipient decomposition and separation of insoluble sapogenin. The strained liquid was mixed with alcohol, and after standing twelve hours a precipitate had settled out, but the supernatant liquid was not transparent but only translucent. The fine floating precipitate causing this slight opacity appeared to clog the filter, and consequently the filtration of the tincture was extremely slow and tedious. The marc from each tincture was percolated with a further quantity of water and the percolate reserved. For preparing the tinctures and for the practical notes thereon I am indebted to my friend, Mr. C. A. Macpherson.

The tinctures and percolates were examined, with the following results :—

	Extractive per cent.	Sapogenin per cent.	Glucose per cent.	Saponin per cent.
A.	4·28	0·74	1·6	2·63
B.	4·02	0·67	1·4	2·30
C.	0·14	Trace	Trace	—
D.	0·23	0·06	Distinct trace	0·20

C and D are the water percolates from the marcs of A and B respectively. These results indicate that the most satisfactory tincture is obtained, and that the drug is most efficiently exhausted by cold maceration and percolation.

A tincture of quillaja is frequently used in Edinburgh for hairwashes, and I find a general impression prevails to the effect that by using heat a stronger and more syrupy tincture is obtained, which froths more readily and is a better emulsifying agent. The foregoing results do not tend to support such an impression. Possibly the small quantity of glucose in the tincture made by heat may give a certain tenacity to the liquid, which tends to preserve the froth longer; but a few experiments made with A and B, both as to frothing and emulsifying, indicate little or no difference, and if there is any difference it is in favour of the cold-made tincture. In any case boiling should be avoided, and if heat is to be used at all it should only be in the form of infusion.

It will also be seen from the above table that the quillaia is practically exhausted by the cold process, whereas exhaustion is less complete by the comparatively rough method of washing the marc on the strainer, as ordered in the American process.

The decomposition of the saponin does not come out fully in the above table, because, though the change has taken place, the quantity of alcohol is sufficient to keep in solution the sapogenin formed. That such a change has taken place, however, is

* Read before the Pharmaceutical Society of Great Britain, at an Evening Meeting in Edinburgh, Thursday, January 30.

indicated by means of Fehling's solution. If a little of the American tincture is warmed with Fehling's solution reduction takes place immediately. With the cold made tincture, under similar circumstances reduction does not take place until it has been boiled for a time.

Another feature in the American formula which seems unnecessary is the intermediate stage of mixing the watery decoction with alcohol, allowing to stand twelve hours and filtering. There does not appear to be any advantage in dissolving out mucilaginous matter with water and then precipitating it with alcohol. It would be an advantage to avoid this stage altogether, and this could be done by simplifying the formula, as follows:—

Quillaja bark, in fine chips .	8 troy ounces.
Alcohol	1 pint.
Water . .	enough to make 3 pints.

Mix the alcohol and water; pack the bark in a percolator; moisten with 1 pint of menstruum; allow to stand twelve hours and then percolate with the remainder, adding water until the percolate measures 3 pints. Filter if necessary.

Mr. Boa, in the paper to which I have referred, showed that such a process is efficient, and that quillaja bark can be completely exhausted by percolation with proof spirit. The American menstruum is deficient in alcohol, as is shown by the tinctures now exhibited, which are beginning to throw down a deposit. Mr. Boa also showed that a menstruum containing less alcohol than the proof spirit of the British Pharmacopœia gave a tincture which deposited on standing. I would therefore suggest that the menstruum in the America formula should be increased in alcoholic strength to 49 per cent. by weight.

With regard to the degree of disintegration of the bark I think the American standard of fine chips is much better than the No. 20 powder of the B.P.C. formula. Quillaia bark is exceedingly difficult to reduce to fine powder, both on account of its toughness and its very irritating effect on the nasal mucous membrane, as all those can testify who have had to deal with it. So fine a state of division is, moreover, quite unnecessary, and never, so far as I have seen, adopted in practice. I would therefore suggest that the formula of the B.P.C. unofficial formulary should be altered in this respect, and fine chips substituted for No. 20 powder. As an ordinary emulsifying and therapeutic agent it would also, I think, be an advantage to have in the B.P.C. formulary a tincture made with dilute alcohol, in addition to the present tincture made with rectified spirit, which is required only for a special purpose.

[*The discussion on this paper is printed on p.* 633.]

GALLIC ACID.*

Specimens of gallic acid from different manufacturers were procured by Fred Wm. Meissner, Jr., Ph. G., and subjected to the U. S. P. tests. The saturated aqueous solutions yielded no precipitates with an alkaloidal salt, albumen or gelatinized starch, but produced heavy white precipitates with a solution of tartar emetic and ammonium chloride. Even in very dilute solutions of gallic acid a distinct precipitate was obtained by this test, and previous continued washing with cold water did not prevent the precipitation.

* From the *American Journal of Pharmacy*, January.

The Pharmaceutical Journal.

SATURDAY, FEBRUARY 9, 1889.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE REGISTRAR'S REPORTS.

ONLY a few weeks since, when presenting in this Journal some statistics relating to the examinations held during the year 1888, attention was called to the large number of persons who in the course of the twelve months had succeeded in passing the examination entitling them to registration as chemists and druggists in Great Britain. Nevertheless, few readers probably were prepared to learn that they were so considerably in excess of the erasures from the Register during the same time, augmented as these were by the recent periodical expurgation consequent upon the exercise by the Registrar of the legal powers conferred upon him for this purpose. It appears, however, from the statistical report presented to the Council by the Registrar on Wednesday last that the Register of Chemists and Druggists commenced the present year with 63 more names than was contained in it on the 1st of January, 1888, the total number being 13,812 against 13,749. The erasures during the year 1888 numbered 466, of which 234 were consequent upon notified deaths, 7 were made at the request of the registered persons themselves, 2 by order of the Council, and 223 by the Registrar in pursuance of the provision contained in the Pharmacy Act, 1868, after sending two registered letters to which no answer had been received. But on the other hand the additions numbered 529, of which 511 were consequent upon the passing of the qualifying examination, 10 were restorations of lapsed entries and 8 were entries of persons who had produced the statutory declarations that they were in business before August 1, 1868. The addition of this 63 increase of last year to the 293 of the previous year gives a total of 356, as representing the increase in the two years that have passed since the last previous clearing of the Register, or 178 in each year, whilst the increase in the previous biennial term was only 47. It is therefore apparent that notwithstanding the already existing ample provision of qualified chemists and druggists to meet the wants of the public, and despite of the increasingly bitter struggle they have to carry on with unqualified competitors, there have been during the past two years as nearly as possible three

persons acquiring the qualification of chemist and druggist for every two erasures from the Register through death or other causes. It may be claimed, at any rate, that this disposes of the assumption that there exists any undue stringency in the present requirements for acquiring the position of a chemist and druggist in this country.

The statistics relating to the examinations, presented at the same time, have already been practically dealt with in these columns so fully as to leave little to be said. It may however be pointed out to those who are curious in the matter, that by the placing in separate tables the work done by the two boards of examiners an opportunity is afforded of judging of the relative qualities of the candidates who present themselves for examination in London and in Edinburgh, so far as this is revealed by their success in satisfying the examiners. Under the Preliminary examination table, also, a line has been placed for the first time stating the number of certificates that were received during the year in lieu of that examination, and it may be useful to point out that this item is now so considerable that it must not be left out in forming an estimate of the scholastic acquirements of those seeking to enter the pharmaceutical calling. Of course it must be presumed that the 98 persons from whom certificates were received would have been successful if they had sat for the Society's examination, in which case they would have increased the proportion of those who passed in relation to the total examined. A calculation based upon this assumption, which is quite justifiable, will show that the real proportion of rejections last year on account of deficient education in English, Latin and Arithmetic was 44·26 per cent. Whilst writing of this examination reference may be made to the pertinent letter on another page from Mr. SHIELDS, of Mexborough, in which it is stated that the sum which proved a stumbling-block to 118, or 37 per cent. of all the candidates at the last Preliminary examination was worked correctly by 21 out of 25 boys in the fifth standard of a provincial board school.

The report presented by the Registrar upon the numerical strength of the Pharmaceutical Society, although far from being what might be desired, is somewhat more satisfactory than that of the previous year. The Pharmaceutical Chemist Members again show a decrease of 44, and the Chemist and Druggist Members of 21. This decrease in strength in respect to Pharmaceutical Chemists is doubtlessly largely due to the loss of members who joined the Society before 1852 without examination, whilst the decrease in respect to Chemist and Druggist Members is only a step in the progressive extinction of this class. On the other hand the important class of Associates in Business, which decreased by 11 in the previous year, has just recovered this slight retrogression and stands at the same number as at the end of 1886, whilst the Associates not in Business show again an increase of 37. The total number of registered persons belonging to the Pharmaceutical Society as Members or Associates at the date of the report was therefore 4547, or 32·92 per cent. of the whole, the items being Pharmaceutical Chemist Members, 1682; Chemist and Druggist Members, 643; Associates in Business, 1281; and Associates not in Business, 941. In addition there were 1023 Apprentices.

We are frequently in receipt of letters in which complaints of the hardships to which chemists are subject are accompanied with suggestions for their remedy, and it is often evident from the nature of many of these communications that the writers entertain very erroneous ideas as to the existing powers of the Society's Council and the probability of their extension. Without referring to cases in which it is proposed that the Council should obtain legislative restriction of the trade in drugs, we may give, as an illustration of the impracticable nature of the suggestions offered, some extracts from a letter received from a district of Lancashire, where the population is about 13,000, with a small town in its centre in which there are four chemists' shops, but where three other tradesmen have licences to sell patent medicines and in addition some twenty-five other tradespeople, chiefly hairdressers, ironmongers, grocers, bakers, and small shopkeepers also sell such articles as linseed-meal, castor oil, cod-liver oil, infants' and invalids' foods, paregoric, glycerine, cough mixture, sweet nitre, seidlitz powders, magnesia and many other drugs. The writer appears to regard this circumstance as a hardship greater than those experienced in large towns, and he suggests that if the Council were to give all Minor men exemption from liability to jury service and the right to call themselves pharmacists, the number of subscribers to the Society might be increased. That is possibly the case, but even supposing the Council had power to do as suggested, we fail to perceive how this would remedy the hardships complained of.

* * *

The next Evening Meeting of the Pharmaceutical Society in London will be held on Wednesday, the 13th inst., at 17, Bloomsbury Square, when a paper will be read on "The Proper Time for Collecting Aconite Root," by Mr. P. W. Squire, and one on "The Congealing Point of Oil of Anise," by Mr. J. C. Umney.

* * *

The next meeting of the Chemists' Assistants' Association will be held on Thursday, Feb. 14th, at the Hanover Rooms, Argyll Street, Regent Street, when the first of a series of two lectures on "The Ear as a Musical Instrument" will be delivered by H. Macnaughton Jones, M.D. The lectures will be fully illustrated by diagrams (shown by the lime-light), instruments, etc., and will commence at 8·30 p.m. Non-members wishing to attend may obtain tickets from the Hon. Secs., 103, Great Russell Street.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, February 6, 1889.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Messrs. Allen, Atkins, Butt, Cross, Evans, Greenish, Hampson, Hills, Martin, Newsholme, Nichol, Richardson, Robbins, Savage, Schacht, Southall, Symes and Watt.

The minutes of the previous meeting were read and confirmed.

Ballot for Retirement of Members of Council.

The lot having been taken in the usual manner to determine the seven members of the Council who should retire in May next, the following names were drawn:—

Allen.	Hills.	Nichol.
Bottle.	Martin.	Schacht.
Greenish.		

The following, who remained in by lot last year, now retire by rotation:—

Butt.	Newsholme.	Southall.
Carteighe.	Savage.	Watt.
Cross.		

The following seven remain in office another year:—

Atkins.	Hampson.	Robbins.
Evans.	Richardson.	Symes.
Gostling.		

Decease of an Honorary Member.

The PRESIDENT announced that since the last meeting an intimation had been received of the death of Sir William O'Shaughnessy Brooke, originally known as Sir William O'Shaughnessy, one of the Honorary Members elected a good many years ago, and one who in the early days of the Society did a good deal of active work in collecting specimens for the Museum. He was well known in the East, having been a medical officer in the service of the East India Company as a botanist, and was a friend of Dr. Pereira. The President concluded by moving that a letter of condolence be sent to the members of the family of the deceased.

The VICE-PRESIDENT seconded the motion, which was carried unanimously.

Diplomas.

The undermentioned, being duly registered as Pharmaceutical Chemists, were respectively granted a diploma stamped with the seal of the Society:—

Clague, Thomas Maltby.
Clark, James.

Elections.

MEMBERS.

Pharmaceutical Chemists.

The following having passed the Major examination, and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Barlow, Alfred Henry.....Gee Cross.
Browne, Frank.....London.
Brunyee, Arthur .....London.
Butcher, William Frederic ...Blackheath.
Clague, Thomas Maltby.....Newcastle-on-Tyne.
Clark, James .....Aberdeen.
Mander, Alfred ....Malvern.
Ough, Lewis.....London.
Salter, William Appleton .....London.
Vawser, Arthur ..... London.

Chemists and Druggists.

The following, who were registered as being in business on their own account before August 1, 1868, having tendered their subscriptions for the current year, were elected "Members" of the Society:—

Haslop, William ....Oldham.
Waters, Henry Griffiths.....Burgess Hill.

ASSOCIATES IN BUSINESS.

The following having passed their respective examinations, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Minor.

Atherton, Albert George .....Tunbridge Wells.
Begg, Arthur .....Liverpool.
Burrell, William Holmes.....Sherringham-on-Sea.
Cooper, Frederick Ashley .....Cockermouth.
Hartill, Ambrose .....Coseley (Staffs.).
Hebbeler, Karl.....London.
Ryall, Frederick John .....Stoke (Devonport).
Wilson, John Codnor .....Bridge.

Modified.

Hodge, John..... .....Dundee.

ASSOCIATES.

The following having passed the Minor examination, and tendered (or paid as "Apprentices or Students") their subscriptions for the current year, were elected "Associates" of the Society:—

Ainley, Edward Theodore.....Mirfield.
Brown, James Joseph.....Perth.
Douglas, William Boyce .....Torquay.
Duffin, Charles William.....Wakefield.
Ebbage, Henry Edward.....Halesworth.
Ferguson, John .....Falkirk.
Kennedy, Alexander .....Glasgow.
Lowe, Sam Peter .....Sheffield.
Marshall, Robert James.....Boston.
Morley, William John .....Jersey.
Noak, Walter Frederick.....Droitwich.
Peterkin, Charles John .....Elgin.
Shrubsole, Alfred .....Chester.
Smith, Charles.....Wellingborough.
Williams, William George.....Hirwain.
Younger, William Elliot .....Brampton.

APPRENTICES OR STUDENTS.

The following having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Angel, Lorenzo Valencia .....Birmingham.
Armitage, Thomas ... .New Shildon.
Austen, John .....Sheffield.
Chadwick, George William ...Saltburn.
Cockrill, James Shattock .....London.
Collett, Archibald R. Matthews.Gloucester.
Cooper, Lionel .....Southsea.
Coulson, Thomas.....Leicester.
Cowley, Thos. Norbert B. .....Ross.
David, Archibald Sinclair.....St. Clears.
Ecclestone, George Thomas ...Soham.
Fairburn, Henry .....Hutton-Bonville.
Gadd, Henry Wippell.....Exeter.
Gibson, Mary .....London.
Goodwin, James .....Nuneaton.
Hackshaw, Harry Roche ..... London.
Harbin, George Albert .....Landport.
Harris, George Robert .....Bradford.
Holt, Robert Dickinson.....Bowden.
Hunter, Stanley .....Liverpool.
Jones, J. Lloyd .....Chester.
Kirkby, John George.. .....Algar Kirk.
Ladell, Richard Savory .....Norwich.

Latchmore, Alfred .....Plymouth.
Macdonald, Donald Ewen ...Lancaster.
Martin, Arthur Benjamin .....Lowdham.
Morgan, Alfred ....Market Drayton.
Neill, William .....Govan.
O'Brien, Albert Christopher ...Pembroke Dock.
Owen, David.....Flint.
Perl, August.....Stoke Newington.
Reeve, Walter .....Norwich.
Roberts Llewelyn Owen .....Stafford.
Scott, James Hugill .....Penrith.
Severs, Charles .....Kingston on Thames.
Shearer, George .....Edinburgh.
Simpson, Langham Dale .....Berkhamstead.
Stockdale, Richard.....Skipton in Craven.
Thomas, William Walter .....Aberystwith.
Umney, John Charles .....Sydenham.
Vinden, Frederick William ...London.
Wallace, William John .....Plympton.
Walton, Frederick John .....York.
Westlake, George Frederick...London.
White, John W. .....Stoney Stratford.
Wilkie, Adam Laidlaw .....Galashiels.
Wilson, Richard Henry.....Elton.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

Restorations to the Register.

The names of the following persons, who have severally made the required declarations and paid a fine of one guinea, were restored to the Register of Chemists and Druggists:—

George Blount, 51A, High Street, Camden Town, London, N.W.
Jabez Goodson, 226, Blackfriars Road, London, S.E.
Frederick Robert Nichols, 4, Railway Approach, Oxted, Surrey.

Addition to the Register.

The Registrar reported that—

Stephen Sagar, of Trawden, Lancs.,

having made a declaration that he was in business before the passing of the Pharmacy Act, 1868, and this declaration having been duly supported, his name had been placed on the Register.

Registrar's Report.

The Registrar laid on the table his report as to the numerical strength of the Society, the statistics of the examinations, and the state of the Registers.

It was resolved that the report be entered on the minutes and published in the Transactions.

It is printed on pp. 632 and 633.

Reports of Committees.

Finance.

This report, which included a statement that the accounts of the North British Branch had been before the Committee, having been read,

The President, in moving the adoption of the report, said there was nothing special in the receipts, or in the expenditure, excepting that it included the solicitor's half yearly bill of costs, in connection with which he would draw attention to the fact that the expense of prosecuting offenders was always considerably in excess of what was received from penalties. The accounts of the North British Branch had been received and passed, and the Committee had found them very satisfactory, and were able to congratulate the Executive of the North British Branch on the careful way in which it had conducted the Society's business in Edinburgh.

The motion was unanimously agreed to.

Benevolent Fund.

The report of this Committee included a recommendation of the following grants:—

£15 to a member (aged 72) connected with the Society for forty-six years, who has lately had to sell his business on account of failing health. (Essex).

£10 to a registered chemist and druggist (aged 62). Applicant had been in business for over thirty years, but had to relinquish it owing to failing health. Is unable to undertake any permanent duties. (London).

£10 to the widow of a former member and subscriber (aged 43), whose case was not entertained on a former occasion. She has five children dependent on her, and is endeavouring to earn her living by letting apartments. (Lancashire).

The Committee recommended that the word "improved" in No. 12 of the Regulations of the Fund be omitted, also that the list of donors in the Hall be completed to the present time.

The Vice-President, in moving the adoption of the report, said it was satisfying to find that the list of applications for relief had been much lighter than usual. Having given some details of the cases which had been reconsidered, he explained the reasons which led the Committee to recommend the alteration of regulation 12, which had been hitherto to the effect that pensions might be withheld or terminated by the Council "if the *improved* circumstances of the pensioner at any time shall appear to the Council to disqualify him or her," etc. A case had come before the Committee in which one of the annuitants had become an inmate of a public hospital, consequent upon having an internal and incurable disease. The hospital was now desirous of getting rid of the patient, and either the hospital in question, which obtained money from the public for the purpose of dealing with such cases, or the poor-law authorities, would have to take the responsibility; and it appeared to the Committee that it would be well if there was power given to terminate or suspend the payment of an annuity in cases where it really did no good to the recipient. If the Council sanctioned the proposed alteration it would meet the difficulty.

Mr. Butt seconded the motion, which was agreed to unanimously.

Library, Museum, Laboratory and House.

Library.

The report of the Librarian had been received, and included the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
December	Day	503	34	2	22
	Evening	155	27	3	10
Year 1888.	**Day**	**6372**	**46**	**1**	**22**
	Evening	**1703**	**27**	**0**	**8**

Circulation of books.	Total.	Town.	Country.	Carriage paid.		
December	240	116	124	£1	11	3½
Year 1888	**3506**	**1797**	**1709**	**£22**	**12**	**2½**

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

For the Library in London—

Year-Book of Pharmacy, 1888. 2 copies.
From the British Pharmaceutical Conference.
—Another copy. From Mr. Richard Bremridge.
Linnean Society of London, Proceedings, 1883–86.
—General Index to Journal and Proceedings, Botany, 1838–86. From the Society.
Hooker, Flora of British India, Part 15, 1888.
From H.M. Secretary of State for India.
Royal Society of New South Wales, Journal and Proceedings, vol. 22, part 1. From the Society.

Illinois Pharmaceutical Association, Proceedings, 1888. From the ASSOCIATION.

Heimann, Der Kohlensäuregehalt der Luft in Dorpat, 1888.

Pacht, Untersuchungen über das Verhalten der Fette zu Zuckersolutionen, 1888.

From PROFESSOR DRAGENDORFF.

Guy's Hospital Reports, vol. 45.

From the HOSPITAL.

The Committee recommended that the undermentioned works be purchased:—

For the Library in London—

Balfour (Bayley), Botany of Socotra, vol. 31 of Trans. Roy. Soc. Edin.
British Pharmacopœia, reprint 1888.
Whitla (W.), Pharmacy, 5th ed.
Wanklyn (J. A.), Water Analysis, 7th ed.
Moeller (J.), Pharmakognosie, 1889.
Binz (C.), Arzneimittellehre, 1889.
Kobert (R.), Arzneiverodnungslehre, 1889.
Husemann, Pharmakognosie.
British and Colonial Druggist.

For the Library in Edinburgh—

British and Colonial Druggist.

A letter of thanks from the École supérieure de Pharmacie de Paris for the *Pharmaceutical Journal* was read.

A parcel of *Journals of the Chemical Society* for the Research Laboratory had been received from Mr. Gale, and the Committee recommended that a letter of thanks be sent to him for the same.

Museum.

The Curator's report had been received, and included the following particulars:—

	Attendance.	Total.	Highest.	Lowest.	Average.
December	Morning	433	36	3	22
	Evening	81	17	0	4

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Large specimen of the root of *Bryonia dioica.*
From Messrs. H. J. AND H. MATHEW, London.

Specimen of Palembang Benzoin.
From Mr. J. HUMPHREYS, Sheffield.

Specimen of the fruits of *Tetranthera citrata.*
From Messrs. SCHIMMEL AND CO., Leipsic.

Fine specimens of Cascara Sagrada bark and of an African Millet (used for rickets).
From Messrs. WRIGHT, LAYMAN AND UMNEY.

Specimen of *Cirendia pusilla.*
From Mr. C. D. CUMBER, Guernsey.

Specimen of *Carex montana.*
From Mr. E. H. FARR.

To the Herbarium—

Specimens of *Senecio sarcacenicus, Lysimachia thyrsiflora, Xanthium spinosum, Centaurea solstitialis, Gypsophila paniculata, Sisymbrium pannonicum, Plantago arenaria, Erysimum orientale.* From Mr. J. W. WHITE, Clifton.

To the Socicty's Museum in Edinburgh—

Specimen of Chrome Iron Ore from Unst, Shetland. From Mr. A. SUTHERLAND, Unst.

The condition of the heating apparatus in the new building had been discussed and referred to the Building Committee, as also some other suggestions for improving the arrangements in the building.

The Committee having discussed the resolution passed by the Council last month with regard to the appointment of local secretaries in London, was of opinion that it is desirable for the Council to appoint a divisional secretary in each Parliamentary division of London, such secretaries to be members or associates in business.

Certain accounts had been approved, and slight repairs in the house were recommended.

The PRESIDENT, in moving the adoption of the report, said there had been nothing in the routine business calling for special notice. With regard to the heating apparatus in the new building and keeping the upper part of the staircase warm, the Committee recommended that the Building Committee should be requested to deal with these little matters. They would not involve any great expense, and some portion of what was suggested might not be required if the heating apparatus as a whole proved sufficient. It was claimed on behalf of the manufacturers that the apparatus would work perfectly well if not interfered with, and of course the endeavour would be to have it made thoroughly efficient without any further expense. With reference to the special matter referred to the Committee by the Council the Committee after a long discussion came unanimously to the conclusion that it would be desirable and is practicable to obtain gentlemen in every division of the metropolis who would be willing to act as divisional secretaries. If the Council approved of the motion he should suggest that it should be relegated to the Committee to ascertain the names of gentlemen willing to serve. Whatever the final mode of election might be hereafter it would be better first to try and find those willing to undertake the duties, and assist the Council in Parliamentary and other ways, as well as in obtaining subscriptions to the Benevolent Fund. It would be difficult to follow the plan adopted with regard to the election of local secretaries in the country, at any rate at the outset, and, therefore, he thought it would be wise for the Council to appoint directly in the first instance until it saw how the arrangement worked.

Mr. MARTIN suggested that it would be well when this matter was before the Committee to take into consideration whether divisional secretaries should not be appointed all over the kingdom. Under the present system local secretaries were appointed in some towns where there were three members, but there were many towns and districts where there were none.

Mr. WATT said he had abstained from saying anything on the question of raising money for the Benevolent Fund in London at the last meeting, but it appeared to him that the President and Committee had probably arrived at as satisfactory a solution of the question as possible. He did not think it would be wise at the present time to raise the larger question suggested by Mr. Martin.

Mr. HAMPSON thought possibly there might be some criticism outside with regard to the method of appointment, but he quite agreed with the view of the Committee that at any rate for the present it would be better for the Council to make the appointments. If in future it was found that sufficient interest was taken by the members in the different districts for them to take part in an election it would be very easy to make the constitutional alteration in that direction.

Mr. RICHARDSON did not wish to controvert the conclusions the Committee had arrived at, but he very much sympathised with what Mr. Martin had said, and thought probably this would lead to further action by the Council, and possibly the appointment of divisional secretaries in some other large towns in England. With regard to the subscriptions to the Benevolent Fund, he believed that Glasgow was the second city in the empire, and he noticed that the amount subscribed from there was very miserably small. Edinburgh did give a respectable amount, and he hoped the people in Glasgow would in future follow their good example.

Mr. CROSS said if the question of the appointment of local secretaries was going to be considered by the Committee he would throw out the suggestion that it should consider whether there could not be held at least once in three years a conference of the local

REGISTRAR'S REPORT.

MEMBERS, ASSOCIATES, AND APPRENTICES OF THE SOCIETY FOR THE YEAR 1888.

	Life Members.		Subscribing Members.		Associates in Business.	Associates not in Business.	Apprentices
	Pharmaceutical Chemists.	Chemists & Druggists.	Pharmaceutical Chemists.	Chemists & Druggists.			
Number in 1887	211	2	1515	662	1270	...	...
,, restored, 1888 ...	1	...	2	3	8	...	...
,, elected, 1888 ...	2	...	55	8	130	...	...
	214	2	1572	673	1408	...	...
Deaths, Secessions, etc. ...	5	...	99	32	127	...	...
Total Strength of the Society	**209**	**2**	**1473**	**641**	**1281**	**941**	**1023**
Summary:—							
1887	211	2	1515	662	1270	906	1125
1888	209	2	1473	641	1281	941	1023
Increase	...	...	...	...	11	35	...
Decrease	2	...	42	21	...	...	102

COMPARATIVE STATEMENT OF THE NUMERICAL STRENGTH OF THE SOCIETY FOR 5 YEARS: 1884-88.

MEMBERS.—PHARMACEUTICAL CHEMISTS.

	1884	1885	1886	1887	1888
Restored to Membership ...	4	8	2	4	2
Elected ,, ...	52	50*	44	57	55
(Total additions) ...	56	58	46	61	57
Deaths, Secessions, etc. ...	71	91	88	88	99
Decrease ...	15	33	42	27	42
Total Number of Subscribing Members	**1617***	**1584**	**1542**	**1515**	**1473**

MEMBERS.—CHEMISTS AND DRUGGISTS.

	1884	1885	1886	1887	1888
Restored to Membership ...	6	6	2	1	3
Elected ,, ...	16	8	6	9	8
(Total additions) ...	22	14	8	10	11
Deaths, Secessions, etc. ...	43	29	40	40	32
Decrease ...	21	15	32	30	21
Total Number of Subscribing Members	**739**	**724**	**692**	**662**	**641**

ASSOCIATES IN BUSINESS.

	1884	1885	1886	1887	1888
Restored	3	8	5	3	8
Elected	114	113	121	100	130
(Total additions) ...	117	121	126	103	138
Deaths, Secessions, &c. ...	61	94	106	114	127
Increase ...	56	27	20	...	11
Decrease ...	...	...	...	11	...
Total Number of Associates in Business	**1234***	**1261**	**1281**	**1270**	**1281**

ASSOCIATES NOT IN BUSINESS.

	1884	1885	1886	1887	1888
Increase ...	7	53	12	7	35
Total Number of Associates not in Business	**834**	**887**	**899**	**906**	**941**

APPRENTICES OR STUDENTS.

	1884	1885	1886	1887	1888
Increase ...	58	64	...	...	...
Decrease ...	...	...	26	69	102
Total Number of Apprentices or Students	**1156**	**1220**	**1194**	**1125**	**1023**

LIFE MEMBERS.

	1884.	1885.	1886.	1887.	1888.
Pharmaceutical Chemists	**228**	**225**	**216**	**211**	**209**
Decrease	1	3	9	5	2
Chemists and Druggists	**2**	**2**	**2**	**2**	**2**

* 1 who paid in 1884 as an Associate in Business, afterwards passed the Major, and was elected a Member in the same year.

ANALYSIS OF EXAMINATIONS FOR THE YEAR 1888.

FIRST OR PRELIMINARY EXAMINATION.

Number of Candidates during the Year.	Number of successful Candidates during the Year.	Number of Rejections during the Year.	Number of Examinations during the Year.	Average number of Candidates at each Examination.	Average number of Rejections at each Examination.	Percentage of Rejections.
1393	733	660	4	348·25	165·00	47·38

Number of Certificates received in lieu of the Preliminary Examination ... 98

MAJOR, MINOR, AND MODIFIED EXAMINATIONS.

ENGLAND AND WALES.

Number of days on which the Board met for conducting the Major, Minor, and Modified Examinations 32
Average attendance of the Members of the Board of Examiners at each meeting ... ... 15·90

Examinations.	Number of Candidates during the Year.	Number of Successful Candidates during the Year.	Number of Rejections during the Year.	Number of Examinations during the Year.	Average Number of Candidates at each Meeting.	Average Number of rejections at each Meeting.	Percentage of Rejections.
Major	114	64	50	6	19·00	8·33	43·86
Minor	884	398	486	6	147·33	81·00	54·98
Modified	3	1	2	2	1·50	1·00	66·66

SCOTLAND.

Number of days on which the Board met for conducting the Major and Minor Examinations 16
Average attendance of the Members of the Board of Examiners at each Meeting ... ... 8·50

Examinations.	Number of Candidates during the Year.	Number of successful Candidates during the Year.	Number of Rejections during the Year.	Number of Examinations during the Year.	Average Number of Candidates at each Meeting.	Average Number of rejections at each Meeting.	Percentage of Rejections.
Major.....	3	2	1	2	1·50	0·50	33·33
Minor..... ...	207	112	95	4	51·75	23·75	45·89

THE REGISTERS OF PHARMACEUTICAL CHEMISTS AND CHEMISTS AND DRUGGISTS, 1888.

Additions during the year:—

Number of persons who have passed the—		
Modified Examination		1
Minor ,, ...		510
Major ,, ...	66*	
Number of persons registered on payment of the Registration Fee, having been in business before August 1, 1868		8
Number of persons restored to the Register on payment of a fine		10
		529

Erasures during the year:—

Deaths:—	
Notices from Registrars	157
Other sources	77
Erased at the request of registered persons themselves	7
Erased by order of the Council	2
Erased by the Registrar in pursuance of the provision set forth in Section 10 of the Pharmacy Act, 1868, after sending two registered letters, to which no answer has been given..	223
Increase of numbers on the Register	63
	529

* These having already been included in the number who passed the Minor, do not increase the numbers on the Register.

Number of Pharmaceutical Chemists on the Register, December 31st, 1888	2,154	
,, Chemists and Druggists	11,658	
		13,812

secretaries from different parts of the kingdom. He thought much of the misunderstanding and unpopularity of the Society depended on the want of information by those who were supposed to be its officials. If they could be gathered together, and put more in harmony with the Society they might be a source of strength, whereas now he feared that sometimes they were too apt to fall in with adverse criticism which they heard in their own neighbourhoods.

Mr. SOUTHALL thought the annual meeting was the time when the local secretaries might be expected to come up to London.

Mr. CROSS said he meant of course that their expenses should be paid.

Mr. SOUTHALL thought with regard to appointing these London secretaries, that it would be better to begin as it was intended to go on, and send a circular to all chemists in the different divisions asking them at once to take an interest in the matter, and appoint local secretaries in the different divisions.

Mr. ATKINS supported the recommendations of the Committee that the Council should appoint these gentlemen directly. Bye and bye the Council might succeed in eliciting that feeling in London which existed or ought to exist in the country, and which led to the nomination of local secretaries. He hoped Mr. Martin's suggestion would be taken up later on, but advised him not to press it now. There were certain cases in which, unfortunately, there was a great want of interest even in the country, and no nomination of a local secretary was made in consequence; and he had been perfectly amazed to see that a large town like Bradford had no local secretary. It would be clearly advisable for the Council to appoint a local representative there.

Mr. NEWSHOLME suggested that it would be better not to multiply titles, but to call these gentlemen local secretaries.

Mr. SYMES said he presumed Mr. Martin's suggestion would not be pressed at the moment, but he had always held that the election of local secretaries should be placed in the hands of those in the immediate neighbourhood. That was the only weak feature in this proposal. He could quite imagine that in the divisions in London there would be a larger population than in many large towns, and it seemed to him that the gentlemen appointed should be those to whom the chemists in their neighbourhood would like to refer matters, and who were in harmony and good fellowship with their neighbours. There was some force in Mr. Southall's proposal that, even to start with, nomination should be asked for. With regard to Mr. Cross's suggestion a resolution was passed two or three years ago which was intended to bring local secretaries in the provinces more in touch with the Society than they were at present, its effect being that they should be asked from time to time to report to the Council, but nothing had been done in the matter. If that resolution were followed up, even if it were only to the extent of asking for replies to certain set questions, it would bring the Council more in touch with the secretaries, and show the state of pharmacy in the provinces. He did not know that any difficulty had ever occurred with regard to the boundaries outside of which the various local secretaries should not travel, but it might arise, unless some limits were fixed.

Mr. HILLS said he did not understand whether the suggestion made was to be put in the form of an amendment, but he would appeal to Mr. Symes, as representing a very large town, whether he could not imagine that in London the difficulties were very much magnified, and that in the different districts in London chemists practically knew nothing of their neighbours. That was the real difficulty in the first instance, and therefore it would be better to select men whom the Council knew took an interest in the affairs of the Society, and who would be willing to undertake the work.

Mr. EVANS said he was pleased to find that the London chemists were adopting the principle of home rule, and no doubt they understood their business better than men in the country could do. He was quite prepared to support any suggestion from the London chemists as to the best way of appointing local secretaries, and he hoped when a suggestion came from the country in the same way a similar reception would be accorded to it.

Mr. MARTIN said he did not wish at all to interfere with the method of election, but what he wished to point out was that under the present system there were some little places with 10,000 inhabitants which had a local secretary, whereas some places with over a quarter of a million had no local secretary at all. He thought the best name would be honorary secretaries, and as this new departure was being taken it would be a very opportune time for the Committee to go into the larger question, and consider whether the appointment of honorary secretaries should not be extended.

Mr. ROBBINS thought it would be unwise to call these gentlemen local secretaries, as it might be thought they occupied the same position as local secretaries in the country, which was not intended. It would be very difficult for a divisional secretary in London to get amongst his neighbours, and he feared many persons would not care to take office. Still, there was no harm in trying the experiment, though he feared these gentlemen would not be very popular.

Mr. ALLEN supported the use of the term divisional rather than local secretary. There had been a long discussion in the Committee on this question, and it was not thought that that term should be adopted. It was not contemplated that these secretaries should collect subscriptions to the Society, as was the case with the local secretaries.

The PRESIDENT said the tenor of the discussion seemed to show that the opinion of the Council was in favour of the recommendation of the Committee. It was a question whether the Council should go further and deal with the subject throughout the country on the lines of the new Parliamentary divisions, but the object of calling these officers in London divisional secretaries, as suggested by some of the country members, was because it was usual for some of the local secretaries to apply for subscriptions, and it was not thought desirable in London to impose that obligation on the divisional secretaries. In fact, he had a strong feeling himself that the local secretaries in the country would have a much better chance of promoting good will amongst the members of the trade if they had not to collect subscriptions; dunning was not at any time a pleasant office to perform, and it was probably to this that Mr. Robbins referred when he spoke of the possibility of these gentlemen not being very popular. The view of the Committee was that these gentlemen should not be merely collectors for the Benevolent Fund, but local representatives of the Society, who might be invited to meet from time to time when their services were required in connection with Parliamentary matters and otherwise, and that such a body of men would be a source of strength to the Society. The term "honorary secretary" was not a convenient one, though, of course, all these offices would be honorary, but he thought "divisional" was a very good term, and would meet the case very well. If Mr. Martin would bring forward the suggestion he had made on some subsequent occasion he was sure the Committee would consider it very carefully, and would be very glad of any assistance he could give in discussing the matter.

The motion was then put and unanimously agreed to.

The PRESIDENT then moved, and it was carried unanimously:—

"That the Library, Museum, Laboratory, and House Committee take the necessary steps for obtaining the names of gentlemen willing to undertake the position of divisional secretaries, and report to the Council."

LAW AND PARLIAMENTARY.

The Committee having considered the form in which the amended Pharmacy Bill should be presented to Parliament and discussed the subject at considerable length, submitted a draft Bill in the following form:—

A Bill intituled an Act to amend the Pharmacy Act, 1852, *the Pharmacy Act*, 1868, *and the Pharmacy Act* (1868) *Amendment Act*, 1869.

Be it enacted by the Queen's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal and Commons in this present Parliament assembled, and by the authority of the same, as follows:

1. The powers of the Pharmacy Act, 1852, of the Pharmacy Act, 1868, and of the Pharmacy Act (1868) Amendment Act, 1869, with respect to examinations required for obtaining certificates of qualification under the said Acts, or either of them, shall be extended so as to allow of the division of the said examinations into preliminary and other parts of the same; also to allow of or require periods of time and courses of instruction between any of the said parts; and to require that persons presenting themselves for the final part of an examination shall have deposited with the Registrar under the said Acts certificates of their having duly attended courses of instruction in chemistry, botany, and materia medica, and having for not less than three years in the whole served in the open shops of chemists and druggists or in public hospitals or dispensaries as apprentices or pupils of chemists and druggists qualified in accordance with the law of the country in which they are carrying on business to dispense the prescriptions of persons legally qualified to practise medicine in that country.

2. It shall be lawful for the Pharmaceutical Society of Great Britain from time to time, by bye-laws duly confirmed by the Privy Council, to regulate the said division of examinations and also the said periods of time and study between any of the said parts, also to allow and provide for and to regulate the reception of certificates issued by other examining bodies in lieu of or so as to satisfy the examiners in lieu of the preliminary part of any examination, also to provide for and to regulate the courses of instruction in chemistry, botany, and materia medica to be duly attended as aforesaid, also to provide for and to regulate the forms of certificates to be for any purpose of this Act deposited with the said Registrar, and also to provide for and to regulate the notices to be given and fees to be paid by persons intending to present themselves for examination in any part of an examination or desiring any registration under the said Acts or either of them.

3. This Act shall not extend to Ireland.

4. This Act may be cited for all purposes as the Pharmacy Acts Amendment Act, 1889, and shall be construed as one with the Pharmacy Act, 1852, the Pharmacy Act, 1868, and the Pharmacy Act (1868) Amendment Act, 1869, and shall come into operation on the first day of January, one thousand eight hundred and ninety, for the purpose of making bye-laws, but no bye-law for the purposes authorized by this Act shall come into operation prior to the first day of January, one thousand eight hundred and ninety-four.

The PRESIDENT said this was the so-called Educational Curriculum Bill simply and nothing more. There was nothing new in the phraseology, except an alteration of a word or two to make it plainer. The intention was that it should be the same as the Bill introduced last session and the session before, and he therefore moved that the report of the Committee be received and adopted. The Bill differed from the one withdrawn from Parliament last session in the fact that there was no proposed legislation with regard to branch shops. That Bill was introduced in the form it now stood, but in the House of Lords the branch shop question was brought up, and some correspondence ensued between several members of the House of Lords and a number of assistants in different parts of the country, and as a result it was decided to introduce the amendment. It would be remembered that the clause was a source of great difficulty in the House of Commons, and the number of unqualified managers who claimed to have vested interests and rights reserved to them was simply astounding, and it was also striking to find members of Parliament distinctly avowing their opinion that such men ought not to be harshly treated. There were many difficulties in getting a unanimous opinion in the House of Commons in regard to any trade matter, which was not to be wondered at, seeing it was difficult enough to get unity of view even amongst the Society's members. The view of the Committee on this point was, that on the whole it was better for the Society and the trade to work under the existing Act, than to propose any modification in this Bill. He might recapitulate the history of the attempted legislation during the last few years. A strong feeling was expressed throughout the country, differing in different districts according to the amount of pressure existing, that something ought to be done by the Society to restrain the action of limited liability companies, and some six years ago the Parliamentary Committee devoted a considerable amount of care and attention to the drafting of a Bill dealing with the whole subject. The Council was then encouraged by the fact that the Privy Council had asked for the views of the Council in regard to the amendment of the Sale of Poisons Act, and in the Bill which was drafted it was proposed to deal with that and many other questions of considerable importance to the trade, amongst others the patent medicine question. It also included the educational and examination machinery, and the elective machinery of the Society. Several interviews took place with the Medical Department of the Privy Council, who afterwards said it was unable to take up the Bill, and that in its opinion it was the duty of the Government to deal with the sale of poisons, and of the Pharmaceutical Society to deal with its educational and examination machinery. He was also in a position to say that the Department was distinctly opposed to some of the clauses. The Privy Council proceeded to draft a Bill of its own, which was introduced in the House of Lords by Lord Carlingford. In that Bill it was proposed to legalise companies trading as chemists and druggists, by making it essential that a registered manager should be appointed whose name should be over the shop or room where the business was carried on, and who should be liable to the penalties of the Pharmacy Act in the same manner as an individual owner. The principle underlying that clause was to take away the personal element which the Society thought should be retained, and to transfer it from the corporation to the manager. That Bill also contained provisions with respect to the sale of patent medicines which were rather difficult to comprehend, but as far as he could ascertain, they were that patent medicines might be sold by anybody, but if containing poison the word "poison" should be affixed. It also proposed to take away the powers vested in the Society with respect to making additions to the schedule of poisons, and to transfer them to the Privy Council; and lastly it proposed to deal with certain articles, like carbolic

acid, in the same kind of way as patent medicines, allowing anyone to sell them, but requiring a poison label. The Council of the Society opposed that Bill, and some noble lords who assisted the Society held strongly to the principle that that particular clause with respect to the companies was objectionable, and quoted the maxim *qui facit per alium facit per se*. But times had changed, and noble lords who at that time held the same views as the Society had now come to the conclusion that it was impolitic and contrary to the public interest to interfere in any way with the carrying on of the business of chemists and druggists by limited companies, except in the direction pointed to in the Bill. That Bill was referred to a Select Committee, which, however, never sat, and the Bill (modified to some extent, but still having objectionable features) was now waiting to be introduced at the first convenient opportunity by the Lord President of the Council. He considered it a stroke of good fortune that the Poison Bill had not been introduced during the last two sessions, for he had reason to know that the Lord President had been pressed to introduce a measure of the kind, but the pressure of other business had kept it back. There was therefore a Government department, to whom the Council was responsible, ready to legislate on trade subjects, and it was a question how far it was wise for the Society to attempt to legislate on this subject, as some members wished it to do. As far as he could understand the position it appeared to him that no serious benefit could be gained for the members of the Society or the trade with regard to this company trading short of making it wholly unlawful, and the Committee which met on the previous day thought that any attempt to deal with it by the Government plan would only weaken the Society's position. It would lay down once for all that the Council was of opinion that the qualification of the person who managed was sufficient, without the qualification of the principal, and it was held, as he thought, rightly, that it would only be introducing a similar danger to that which had arisen from the widows' clause in the Act of 1868. Having considered the matter, he certainly thought that if any trade question were introduced the Government would bring forward a measure of its own, and seeing the difficulties to be met with in the House of Commons, especially if it were referred to a Select Committee, the majority came to the conclusion that it would be hopeless to attempt to deal with this subject at present. During the last two years he had ascertained the feelings of many members of both Houses of Parliament in talking over the Educational Bill. There was a strong feeling in the House of Commons against giving any additional powers of any kind to corporate bodies, and if any such powers were suggestive of trading interests, the members were inclined to laugh at them. He was extremely sorry that it was so, because the position of the Society was essentially different from that of any ordinary trading organization, and seeing that the spirit as well as the letter of the Pharmacy Act was broken, he believed the safety of the public was not so well cared for as it ought to be under the original terms of the Act. But the answer given was to the effect that Parliament did not care who had the profits of the business, whether a company or an individual, so long as the person who handed over the poison was a qualified man. It was with the full knowledge of the position that the Committee reported. The members of the Committee were all well aware of the position of their brethren in the country and were in full sympathy with them, but they were strongly of opinion that an attempt at legislation in any direction which could promise an advantage would do more harm than good. For such reasons the Committee asked the Council to limit the Bill to the draft now introduced. There was nothing in it controversial. A large part of the opposition last year was on the branch shop clause, and with regard to that subject the Committee came to the conclusion that it was better to leave things as they were and that it would be wiser not only for the sake of getting the Bill passed, but because if the branch shop clause were introduced it was very doubtful whether it would be any improvement on the existing law, and there were serious objections to creating a class of managers. There were many other questions which might be raised, not on purely trade matters, such as the constitution of the Society, the position of members, associates in business, and so on, which had been discussed before, and many of them sympathized with a broader representation, but seeing the difference of opinion even in the Society itself, it was thought as well to get Parliament to accept a Bill which would meet with the smallest possible amount of opposition. Private Bills could only be passed by making arrangements with those who differed, in the lobby of the House, and so getting rid of all opposition, for it was almost impossible to get a clear discussion in the House itself. He therefore moved that the report be received and adopted.

Mr. ROBBINS seconded the motion.

Mr. SYMES said he was a member of the Committee, but he wished to ask the Council to appoint some one in his place, as he was not able to attend. When this Bill was discussed about two years ago, he and certain other members were opposed to going to Parliament with it alone, when there were so many other matters of importance affecting the constitution of the Society and the whole commonwealth of pharmacy. But it was then argued that the only hope of getting the Bill through was to divest it of all controversial matter and make it an education Bill, pure and simple. That was carried by the majority, and he accepted the decision, and had worked loyally in endeavouring to carry it out during the last session. However, he had seen how difficult it was to carry through an educational measure without getting something else attached to it, and therefore he thought the arguments then advanced no longer held good. He could not shut his eyes to the fact that, although the Bill might be introduced in its present shape, the first House that it was considered by might add something to it which might introduce controversy, and he was bound to confess that, whatever importance these arguments once possessed, the importance of the Bill at all had grown considerably less than it was originally. He had been considering what was to be the end of this Bill, and he found to his regret that it was not likely to be anything like what he hoped it would be when he gave a good deal of time and support to it originally. It was not likely that, as a result, there would be established in various centres throughout the country good substantial schools of pharmacy promoted and assisted by the Society, and where there would be a solid education given, something like that at Bloomsbury Square. They were all proud of the school, and he had hoped to find that smaller schools, but on the same model, would arise in different parts. He took it that this Bill was in no way intended simply to advance the interests of the Society's own school. He had hoped that if other schools were established they would become centres of social and intellectual intercourse for the members in the different localities, and that the whole cause of pharmacy would be advanced. But the Council was told last month by the Treasurer that the Society could not afford to help these schools; whilst even Mr. Schacht had given up the hope of seeing such separate local schools, and the best he could hope for would be that they might hang on to the skirts of any of the large University Colleges which existed throughout the country, and which might be induced to give assistance to pharmaceutical students. Experience

however, in that direction was not very promising. The Council was told that, at Birmingham, Mason's College would have instituted classes, but that they could not be supported, and at Owens College the effort had been a failure—there were not enough students to justify the authorities in continuing them. One favourite idea some time ago was that pharmacists were part of the medical profession, but now they were to hang on to the skirts of these colleges. He much doubted if the results hoped for would ever be obtained. He did not think the Bill worth going for in its present form, and he could not see his way to support it, unless it were a more comprehensive measure, dealing with other things, several of which had been mentioned by the President, and another one was the exemption of chemists and druggists from jury service. Several cases of hardship had recently come before him, in which chemists, not members of the Society, and who were generally those who could least afford to leave their business, had been called upon to serve. The question of stores was no doubt a difficult one, and he had never held out the least hope to anyone that it would be possible to close chemists' shops in the stores. He wished it were, but he did think the Legislature would recognise the injustice of individuals converting themselves into limited liability companies for the mere purpose of evading the law. He believed in dealing with things openly, and he was sorry to hear the President say that the only method of legislating now on a matter affecting private interests was to deal with members in the lobby of the House. It was a pity that legislation had fallen to that level, and he thought it should be possible to argue the question openly. The men they thought to get the better of in that way were not asleep, and would find out sooner or later what was being done. As to the objection that Parliament had to giving powers to corporations, it seemed to him the modern tendency was exactly in the opposite direction. The extension of local government showed that Parliament was quite willing to delegate power to people who understood the business they were dealing with. He had supported this Bill so far as a matter of loyalty, but the altered conditions of to-day were such as to justify him in saying that he hoped the matter would be referred back to the Committee with the object of bringing forward a better and a more comprehensive measure if the Society was to go to Parliament at all.

Mr. WATT said it was with extreme regret that he found himself alone on the previous day in the policy he advocated. He would not repeat the arguments he addressed to the Committee, but he must say that he deeply regretted to find that the recommendations made ignored the position of the Society as representing the trade in its trade interests as well as in educational matters. This was probably a turning point in the history of the Society, and the effect of this action would be to place the Society before the trade as a merely educational body, irrespective of trade interests. The Act of 1868 ought to be either repealed or amended, and to go to Parliament simply with this curriculum Bill, without any reference to amending the Act of 1868, would be most injurious to the interests of the Society, and would gradually undermine its influence. Though he was only a young member of the Council, these matters had received his attention for several years, and he was quite aware of the difficulties; but it was only by facing these difficulties in a determined and manly way that they could be overcome. He was not opposed to the Curriculum Bill, and in a conference he had recently had with a number of chemists in Edinburgh he found they were unanimously of opinion that he should support it, but thought an effort should also be made to amend the Act of 1868 by introducing a Bill on behalf of the Society.

Mr. HAMPSON said years ago, when he entered the Council, he felt like a new broom that he could sweep things clean, and tried to, but he soon found that this question, like all questions of importance, had many sides, and it was necessary to weigh almost every consideration at all likely to affect it, and after considerable experience he was brought reluctantly to the opinion that at any rate for the present it was unwise to bring in a grand and heroic measure to amend the Pharmacy Act. It was sometimes much more heroic to wait than to push forward, and he felt in that position to-day. It would be better to accept this comparatively simple measure than to run amuck against the powers that prevailed. If courage were the necessary element for the propulsion of the measure he would join in bringing in as comprehensive a measure as possible before either Houses of Parliament, but what would be the position? In the Bill previously brought forward the Council attempted to do something with the patent medicine question, which was but a small one after all, and what was the result? It immediately brought into existence a coalition of patent medicine houses, and the establishment of a large fund to oppose the measure. What did the two gentlemen who had spoken wish for. They were very indefinite; did they wish to bring in a clause to prohibit limited companies from trading? for that was the kernel of the feeling of the trade. There was not a man at the Council who would not seize the first opportunity to carry such a measure, and supposing the minority carried the Council with them, that would have to be done. It would be a gallant measure, but there would be no chance of carrying it. Mr. Symes said that he had changed his mind with regard to the curriculum, and so had he (Mr. Hampson). He was free to confess that he was at first opposed to this interference with individual liberty with regard to education, but further consideration induced him to go with the majority and support the scheme. Mr. Symes did the same, but he now said that he was discouraged because schools did not spring up. There was no chance of their springing up, because there was not the *vis vitæ* behind them. Once get this measure through Parliament, and then there would be the necessary motive power, and even at the skirts of the various universities it was quite possible that schools or departments would be created, because they would meet a demand. Until that demand was created by the means now proposed there would not be anything like permanent centres of education even in the large towns. What ought the Council to do? Immediately to get the measure through. It would not affect any other questions; it would not disintegrate the Society in the least, but rather bring the members together as a strong body. He could not understand the logic of Mr. Watt in opposing the measure on these grounds. It would surely make it possible in future, even for those who took positions in co-operative bodies, to see that they would get a better position in pharmacy elsewhere, and they would not desire to degrade themselves by becoming the humble servants of those huge trading institutions.

Mr. WATT asked leave to say a word in explanation. He thought that members of the Council would quite understand why he was indefinite, as had been suggested. He would have gone more largely into the subject, but for reasons known to them all he thought it better not to state publicly his views in detail.

Mr. ATKINS supported the Committee's report. He much regretted that the Committee would lose the valuable assistance which Mr. Symes had rendered in the past, and which he still hoped he would render in the future to this measure, and he quite failed to be convinced by his arguments. There was not the ghost of a chance of carrying a controversial question through Parliament, and if it were known that the members of

the Council were divided amongst themselves it would be still more difficult, and, therefore, if not too late, he would make an appeal, as he had appealed in days gone by, that whatever might be the convictions of these gentlemen, unless they were so deep that they dare not suppress them, that having expressed their convictions they would not vote against the measure. He failed to see the force or logic of any opposition, inasmuch as those who advocated the educational measure distinctly avowed that they were perfectly in sympathy with those who went further. It was simply a question of diplomacy. He believed in the influence brought to bear in the lobby of the House of Commons, and that it was there, not by underhand or unworthy means, but by the well-known policy by which all Governments were carried on, and all great questions were arranged, that people holding different opinions met together and conferred, and only in that way was it possible to arrive at a *modus vivendi* by which any measure could be carried. He regretted to hear that this measure had no longer any deep interest for Mr. Symes, because he thought the true view to take was that this was simply an instalment, and that the Council would go further when the occasion arose; the only question was whether it was wise to risk its success by attaching to it conditions which would inevitably have the effect of defeating it. He knew there were burning questions on which many members felt strongly, and was perfectly aware of the distressed condition of many of them. He often had correspondence from men asking him why he did not try to do something for them. He could only say he would do anything he possibly could, but this question of education had deeply impressed itself on his mind as the result of some years' experience, when as a vice-president he attended the examinations, as the absolutely essential thing which might be hoped for to bring about a solution of the difficulty. It was in the interests of the young men themselves, not that he wished to throw difficulties in the way of entering the trade or to raise the standard of examination, but to secure that they should receive a prolonged and careful education, and he felt this to be so important that he would not wreck it by placing on board the boat a number of things which must inevitably send it to the bottom. It was a question of expediency, and looking upon this as a most substantial instalment towards raising even the trade position of the members he urged the adoption of this Bill.

Mr. SYMES explained that he did not say he was opposed to the Bill, but that it had so much diminished in interest that he felt it was not worth the going forward with alone.

Mr. EVANS wished to say one word on the question of the diplomacy of taking this Bill into Parliament just as it was. It was not usual to take a Bill into Parliament and expect to carry everything asked for, and therefore it was much better to put in a few things which your opponents might have the pleasure of striking out. It would be much more likely to enlist the sympathies of the trade, and thus get a strong feeling to aid the passing of the Bill if it were made much more comprehensive. That would awaken the interests of the country, and chemists and druggists would do all they could to influence members of Parliament in their respective districts to carry the measure through. He feared it would be found quite as difficult to pass the Bill as it stood as to pass a more comprehensive one. Chemists would see, at any rate, that the Council was trying to do something, and if it failed to carry out their wishes they would still take an interest in the Society; but unless they saw some attempt to do something they would lose all interest in the Society; and there was no doubt already great dissatisfaction. If their forefathers had been as chicken-hearted about taking Bills into Parliament as the present Council seemed to be the 1868 Act would never have been passed. It would be much better to make a little effort, even if the Bill were thrown out after all.

Mr. HAMPSON said the question was how much the House of Lords or Commons would put in.

Mr. EVANS said he should prefer to see the question adjourned for another month or two that the matter might be more fully considered.

Mr. ROBBINS said the question of the curriculum was one of very old standing. When it was first introduced by Dr. Attfield many were opposed to it, but it had made way until at last there was almost a consensus of opinion that it would be the best thing to adopt. But if it were to be passed, it must not be loaded with any other questions. No doubt there were many questions which were very important, but they were impracticable, and they were questions on which their own members were not agreed. If there were a dozen of these introduced into a Bill, it would not only fail to pass as a whole, but what all were all agreed upon would fail to pass. It was much better to pass this first, and then go in for attacking the stores or anything else they liked to take up. The best way was to do one thing at a time, and he hoped the Council would be unanimous in passing this motion.

Mr. SCHACHT, as one who was very anxious to improve the process by which the young pharmacist became trained for his profession, could not say that he found himself at all dissatisfied with the tone of the discussion as far as it had gone. Even Mr. Symes had qualified his opposition by a remark that showed that he was not very far from being at one with those who were anxious that the proposal as it stood should pass. The main ground of his loss of sympathy with the Bill seemed to depend on the fact that he did not see in the future, as clearly as he had done in the past, the probability of establishing good local pharmaceutical schools. He (Mr. Schacht) regretted with him that there had been such a change in the general spirit and accidents of pharmacy as to make that probability much less than it at once appeared, but a number of educational centres had sprung up which would probably far exceed in value those which the Society could have established, and so long as opportunities for education existed it did not much signify whether they were called university colleges or local pharmaceutical associations or schools of pharmacy. He should not have risen to speak had it not been for a remark which had been made which rather led to the inference that whatever course it was thought right to adopt there, it might be necessary to modify it in the lobby of the House of Commons, and he did not like to leave that matter entirely unnoticed. If the Council came to the conclusion that it would limit its efforts for legislation to those which bore on the subject of education, he thought it should request those who had the management of the Bill in Parliament not to allow the introduction of any subjects outside that. He had himself been pained at the introduction of the amendment in last year's Bill, and had he had a voice in the matter would have opposed it resolutely, holding as he did a strong opinion that it was not fortunate for the public that branch shops should exist at all. He should be very sorry for the Pharmaceutical Society to endorse the principle that branch shops might exist and be recognised. He knew this was a delicate subject, and did not wish to go at length into it, but he hoped that if the Council went simply for an educational Bill nothing else would be tacked on to it. The Bill did not touch pharmaceutical politics in any way, it was merely an effort to improve the processes for the training of young men entering the business, so that the public might be guaranteed a better supply

of professional ability. If the Bill were limited to that, the Council should say point blank to everyone who wished something else, whether a lord or an hon. member, this is not the subject we have come to Parliament for, we only want to improve our process for making good pharmacists, and you must please not ask us to introduce a subject which will deal with the regulation of branch shops or anything else whatever, that must be introduced another time and under different circumstances. He should be glad if gentlemen would express their views as to whether that principle should be kept in view by those who had the management of the Bill.

Mr. CROSS said when this question first came up he remembered expressing the opinion that it would be better to go for one thing at a time, and having adopted that policy he thought it would be childish if the Council were now to adopt a different one, more especially as experience in the meantime had shown the wisdom of the course then adopted. So long as the Bill contained only educational matter it met with little opposition, but the moment the branch shop question was tacked on to it the whole aspect was changed. He was in favour of a stand-up fight, rather than any diplomacy, but such was the diseased condition of the Legislature that unless they held the lobbies someone else would, and the very fact that other people held the lobbies prevented this question coming before the light of day. There were lots of things he should like to see in this measure, but the moment they were introduced there would be found even amongst their own body many different views. He feared it would be Utopian to insist that nothing else should be introduced. The House of Commons existed for the public advantage, and if it thought it necessary in the public interest to insert any additional clause into the Bill it would insist on doing so.

Mr. ALLEN said it appeared to him that by going to Parliament with a free hand, with the Education Bill untrammelled, there was a reasonable hope of passing it, judging by what had occurred in the last session. With regard to the clause relating to branch shops, it appeared to him that it would be impossible and senseless on the part of the Council to introduce a Bill with a clause of that kind. He thanked the President for the narrative he had given at the outset, and also Mr. Hampson for the heroic way in which he had signified his assent to the present proposals. With regard to the opposition, he felt sure that if Mr. Watt remained three or four years longer on the Council he would get up and make just such a speech as Mr. Hampson had made that morning. Everyone acknowledged the zeal and ability of Mr. Symes, and his desire to advance the interests of the Society, but it seemed to him that he had produced no arguments to show that there was the slightest chance of success with regard to trade questions in the House of Commons. Mr. Evans appeared to think that that House was something like the wheel at a village fair, that it was all prizes and no blanks; that they might put in whatever they wanted in a Bill and trust to Providence whether they got through or not; that nothing would be added and nothing subtracted from their present powers. The Act of 1868 was in no sense the Act as originally introduced. This question had been talked over for a long time, and last session the President had spent hours and days in the lobby talking to individual Members of Parliament, and there was no man in the pharmaceutical world who knew so much about the chances of passing an Act as Mr. Carteighe. He told them that such and such things had no chance of being passed, and he was quite prepared to believe him, not only on his own testimony, but from what he had heard himself from Members of Parliament. He had written to one very celebrated man on the subject, and the answer received was—"I will look into your measure and consider it, but I am very jealous of giving corporate bodies any further privileges." That was simply with regard to education; but if the Council went to ask for what appeared to be trade privileges, the House of Commons would say it was a trading body asking for a monopoly and refuse it at once. A great number of the younger members of the Society had endorsed the education principle pure and simple, and glad as he should be to see certain trade questions set at rest one way or the other, he was perfectly content to let the Bill go as an education measure simply, and to do his best to get it through.

Mr. HILLS said it might be as well to state his opinion on this matter so that his constituents might have full opportunity of rejecting him if he did not represent their views. He was heartily in accord with this measure as far as the education scheme was concerned. He had worked on the Committee from the commencement, and the regret he felt to hear the words which Mr. Symes had used with respect to it was very great. He need only refer to what Mr. Symes said last month to show how very sudden his conversion had been, for he then said that he had written to Members of Parliament in defence of this curriculum scheme, and that he had done as much perhaps—with the exception of the President—as any member of the Council to promote this scheme of education. He (Mr. Hills) did not doubt that for one moment; he knew that Mr. Symes had worked as hard as anyone in the matter, and he was very sorry to find that day that because there were certain matters, on which there was great heart-burning amongst their own members, which were not included in the Bill, he damned the work of the Committee with faint praise. The arguments of Mr. Watt, Mr. Symes, and Mr. Evans had been very fairly answered, but he must again appeal to those gentlemen to say what they wanted. He was in perfect sympathy with all those who were suffering under the present distress arising from the competition of the stores and the large moneyed interests, but he saw no way out of it. His own opinion was that before many years the question would be settled entirely on the ground that the seller would be the person responsible to the public, and that the question who supplied the capital was one which the public would say it had nothing to do with. That was happening in other professions, but if that were to be the case he did not want to be an instrument in forwarding it. He would rather it came from outside. Take again the question of branch shops: the gentlemen who had spoken that day were not agreed upon it, and there would be nothing like unanimity in the trade on any such question. No sooner was one of these questions raised than there would be two rival camps, but on the question of education they were fairly united. He was glad to think that the young men were also supporting the Council by their sympathy in this matter, and it would be a great pity if those who shared in that view could not sink their differences and join in going to Parliament with a united front and asking for an improved education for those entering the business.

Mr. MARTIN said that whether he should be in a minority or not, on any particular question, was of extremely small importance to him, but whether his view was the correct one was of supreme importance. On this particular question it was a matter of extreme regret that he found himself to a certain extent at variance with the oldest son now living of the Pharmaceutical Society, and one whose influence and writings had been one of the treasures of his pharmaceutical life. He should have been glad if he could have silently voted for this Bill, but if he were to do so it would be liable to misunderstanding. At the same time he d'd not think it was for the public benefit that he should

publicly express the grounds on which he differed from those who were going to support this Bill. He was entirely in accord with them as to the necessity for a curriculum, and ten years ago he should have advocated this Bill, pure and simple. But he thought it was the part of wisdom to learn by experience, and for that reason he regretted that the members of the Council had had only one opportunity of considering this question. He had spoken in Committee on the subject on the previous day, and he would not in public go further into the matter. He would say, however, that he was by no means scared by that bugbear of the Government Bill which was stored in a pigeon hole. Any Bill which might be brought forward in the House of Commons, if objectionable or injurious to the interests of a large body of men, could be most successfully opposed whenever it was introduced. Their own experience showed that no Government could succeed in passing an Act if those whom it affected were unanimous in opposing it. With these remarks he would simply place on record his deliberate conviction that to proceed with this Bill pure and simple was absolutely valueless.

The VICE-PRESIDENT said, to deal with Mr. Martin's last remark first, he must confess that he never felt more strongly with regard to the advantages of proceeding with an educational measure than at present, or so convinced that the true interests of the trade would be best served by the introduction of the present Bill. To go to Parliament and ask it to put down store trading, or to pass a Juries Bill, or to provide for provincial schools, would be useless; but he was seriously grieved to find that Mr. Watt opposed the measure on the ground that it did not consult trade interests. To his mind it did promote trade interests much better than any Bill which the Council could hope to carry. He said so advisedly, after some fifty years experience in the trade. The time was coming when the educated man would have an advantage over all his competitors, and he did ask that they might go as a united Council to the House of Commons. Unless they did there was very little hope, and he would impress on Mr. Watt that he was accepting the greatest responsibility in opposing the measure. Mr. Watt had nothing to say against it, except that it did not go as far as he would wish. Surely, therefore, he would accept what was proposed, and he might then state what he desired beyond that, and if the Council could see its way to support his views it would do so in the House of Commons and elsewhere. He had for years been obliged to sink a matter upon which he felt very strongly—the patent medicine question—on the same ground. He felt that the compounder of a patent medicine containing poison should be as much an educated man as the man compounding a prescription, but he was told it was futile to attempt to enforce that in the House of Commons, and, therefore, he ceased to press it, though he felt as strongly upon it as ever. He was obliged to bend to circumstances, and he appealed to others who could not have all they wanted to do the same and accept what they could not object to.

Mr. RICHARDSON said he had no desire to prolong the discussion, but he must appeal to Mr. Symes and others to withdraw their opposition. It was rather astonishing, because Mr. Symes was thoroughly with the Council last year in appealing to his friends in Liverpool to assist the Council in passing this measure. There was one point which had not been alluded to, and that was the enormous number of failures in the examinations. He found that last year there were 660 failed in the Preliminary and 486 in the Minor examination, and that alone showed that there was a great want of some system by which the deficiency in education should be stopped at the source rather than lead young men year by year into a false position. This alone would warrant the Council in proceeding with the scheme. It would seem from some remarks which had been made as if the Council was not interested in the position of its constituents; but there was not a gentleman round the table who would not at once adopt any method to improve the position of chemists and druggists; but seeing that there had been so many failures it would be absurd to commit others. Every grain of solid matter on this question had been thrashed out long ago, and the members of the Council must all thank the President for the great labour he had undertaken in the matter. They were all anxious for a comprehensive Bill; he hoped they would all agree to get at least what they could for the benefit of their constituents. It had always been his endeavour to ameliorate the position of retail chemists and druggists throughout the country. He hoped therefore the opposition would be withdrawn. He objected to branch shops, and believed if this Bill were passed it would produce a better educated class of chemists, who would fight the stores on their own ground, and oppose intelligence to the agglomeration of wealth. In the end intelligence would win, and the gentleman who knew his trade thoroughly and conducted it personally would prevail not only against the stores, but against that which is worse, the cutting element which was springing up in nearly every town.

Mr. SOUTHALL said the Council had tried an Education Bill alone for two years and did not seem to have been very successful. No doubt they all wanted an education measure, but the country generally wanted something more, and he was of opinion that the Council might as well go in for something further.

Mr. HILLS asked what?

Mr. SOUTHALL said he left it to the Committee to decide which was the best measure to go for.

Mr. HILLS said the Committee had decided already that it would only go on with this one.

Mr. SOUTHALL thought it would be better to send the Bill back to the Committee to see if it could tack on something else. If only this was done it would be something, and would show the trade generally that the Council was alive to their interests.

The PRESIDENT asked Mr. Symes if he wished to move an amendment?

Mr. WATT said all present appeared to be strongly in favour of the curriculum, and no one in fact condemned what the Committee had done, but only what it proposed to do. He therefore thought it would be hopeless to divide the Council. There was a large minority opposed to the motion. As a matter of curiosity it might be well to take a vote, but as a matter of policy he would not advise it. He would only say, in reply to Mr. Hampson, that he did not consider it for the interests of the Society that he should express his views publicly on the question of limited liability companies. He had been appealed to repeatedly to state what he would do, but probably that would be considered a sufficient answer.

Mr. SYMES said he had not moved an amendment. He had only expressed the opinion that this ought to have been done, and the other not to have been left undone, because leaving the other undone so greatly diminished the value of what was being done. That was perfectly consistent with what he stated at the last meeting.

The PRESIDENT said the Act of 1868 was only obtained after years of effort on the part of the Pharmaceutical Council to arrange its differences with the trade, and then after a Select Committee of the House of Commons had considered the matter. The Council succeeded in 1868, but whether it would succeed now on a trade question he did not know. When it went to Parliament then the House would not have things just as they were proposed; the Bill was referred to a

Select Committee, and after all a new Bill had to be drafted, which met the assent of the Government, and when all that had been done, the Council succeeded about the last day of the session in getting the Bill through Committee. He mentioned this to show that it was not so easy a thing as some gentlemen seemed to suppose to get a Bill through the House of Commons. At that time there was no burning political question before the country, and it was a favourable time. Now every minute of the time of the House was taken up with Government business. With reference to Mr. Schacht's parental advice with regard to the lobbies, he thought he had somewhat misunderstood him. Clauses were not introduced or withdrawn in the lobby, but it was a common thing when a Bill was persistently opposed, in face of the difficulty of getting a public discussion on the floor of the House, for some *amicus curiæ* to fetch half a dozen members on either side who could agree on something practicable. If in assenting to anything of the kind the Bill was deprived of its essence, or emasculated it, or something objectionable was accepted, an attempt must be made to withdraw it. With reference to the clause inserted in the House of Lords, he would remark that it was introduced in spite of his wishes, and when a Bill was introduced it was the property of the House. He could conceive of a poison regulation such as the Council might very much object to being introduced, and it might then insist on the Bill being withdrawn, and he hoped the Society was strong enough to secure that, but it could only be done by permission. It was quite true that it was possible to successfully oppose any measure the trade thought inimical to its interests, but it was a very different thing to push through a measure which was favourable to them. He should like some gentlemen to try it on in the House of Commons, for one session, and see what it meant. He was not afraid of the Government; but if there were two poison Bills in the House, as was the case in 1866, which Bills afterwards formed the basis of the 1868 Bill, the Council might not get a select committee to report in accordance with its wishes, and when once a Select Committee of the House of Commons sat in judgment on pharmacy laws and resolved to recommend certain changes, there would be much greater difficulty in opposing them than in opposing a private measure. A Select Committee was looked upon as a judicially impartial body, and when once it reported it was very difficult for those supposed to be interested to oppose successfully a measure of that sort.

Mr. SCHACHT said he was quite aware that the Council could not stop a Bill when it was once introduced, but what he deprecated was assent being given to any proposition which had not received the full support of the Council; that was a very different thing from the imposition of a clause by the House. If the President gave his assurance that no such thing should be accepted without coming before the Committee he was quite content.

The PRESIDENT said this would come better on a subsequent resolution which he intended to move.

The motion was then put and carried *nem con.*

The PRESIDENT then moved, and Mr. ROBBINS seconded :—

> "That the Law and Parliamentary Committee be instructed to take the necessary steps for the introduction of the draft Bill now agreed to into Parliament."

Mr. Schacht might be quite comfortable about any modification of the Bill. Last year the clause was introduced in the House of Lords, and before the Bill came on for the third reading it was brought before the Parliamentary Committee and the Council, when the view taken was that it was desirable to accept it. It was quite open to the Council to have withdrawn the Bill in the House of Lords. The Council need not have got anyone to introduce it into the House of Commons.

Mr. SCHACHT said he only wished it to be clearly understood that the Council was consenting to nothing but an educational measure.

The PRESIDENT said that was the sense in which he had accepted the vote.

Mr. EVANS said some dark hints had been thrown out as to some measure which the Government might bring in. He could only say that if the Government could invent any Bill which would make the chemists more dissatisfied than they were at present, as far as he was concerned it was welcome to do so.

The motion was carried unanimously.

BUILDING.

This Committee recommend that as soon as possession is obtained of the houses Nos. 15 and 16, Bloomsbury Square, they be pulled down, and the site appropriated for rebuilding, dividing the two frontages so that they should be nearly equal. That No. 15 be rebuilt as a residence, with the usual accommodation, for letting. That No. 16 be rebuilt for the purposes of the Society, the ground floor to be used as secretary's and clerks' offices, with a passage way into the examination hall, one window of the same being altered into a doorway ; a strong room to be constructed in the basement with stationery and book stores, etc. A new council room and committee room to be on the first floor, and the two upper floors formed into rooms for the purposes of the Society, as shown in sketch plan submitted. That the Committee be authorized to obtain the requisite drawings, tenders, etc., and to give the notices, and take all steps necessary for carrying out the works. It was estimated that the cost of building No. 15 as a residence would be about £3000, while No. 16, if built as proposed, would cost from £3500 to £3700. It was also recommended that a portion of the museum, facing Great Russell Street, be added to the Secretary's residence.

The PRESIDENT said the Committee had met several times to consider this matter, and had had the advantage of the presence of several members of the Council who were not on the Committee. Looking to the Society's position as a whole, and at the work of the Society, the Committee had decided unanimously to recommended this scheme. It would be observed that the latter part of the recommendation dealt with the Secretary's private residence. It could have been wished that the Society might be prosperous enough to give him a house to himself, but in the present state of circumstances it would be necessary to wait for a period of seven, fourteen, or twenty-one years to reconsider the matter. At that time some valuable ground rents would fall in, and the Council might then be able to consider whether it would not give the secretary better accommodation than he had had up to that time. Members of Council would probably all agree with the Committee that in the meanwhile better accommodation should be provided for the Secretary than he possessed at present. He had to represent the President and the Council from time to time in his private and official capacity. The reason which had prompted the Committee to make this recommendation now was that it had seriously considered whether it should take the Secretary from this part of the building and put him into a portion of the new one. The rooms the Secretary occupied at the top of the house were practically valueless for the Society, so that on the whole it would be more economical to take away a bit of the Museum, and add it to the Secretary's residence, than to remove him altogether. The proposition with regard to 15, Bloomsbury Square was to make it larger than it now was, so as to

make it a good lettable house, and to use the ground floor of the other as offices, and give a passage from the Square straight into the Examination Hall on the same floor. The Secretary's and clerks' offices would be on the ground floor on a line with it, and over that the council room and committee room. Under the Secretary's office there would be a strong room for preserving valuable documents, for which there was now no proper place. With regard to space, the laboratory of practical chemistry was now full of students, and for some years, owing to pressure from below, the balances and other delicate apparatus were actually kept in the fuming laboratory upstairs, because there was not a separate room to give the professor. That apparatus belonged to the Society and not to the professor, and therefore it was essential that it should be taken care of. Facilities would also be given, if the question should arise later on, for the Society publishing its own Journal. The present council room, which was naturally the continuation of the present library, it was proposed to leave for library purposes, and especially for the use of members who came to consult books, which would be a great convenience to both town and country members and associates. A great many members came in to refer and some to read at night, and at certain hours of the day the students practically filled the present library. This would give sufficient space for some time to come, and provide for the possibility of using the house in another quarter of a century, if need be. Whatever was done at No. 16, Bloomsbury Square, it was essential for the Society to have the ground-floor, and it was found that practically very little would be gained by devoting any portion of it to letting purposes.

Mr. EVANS asked whether this report could not be allowed to lie on the table for a month, so as to give members of the Council time to consider the scheme and to look at the plans. No doubt the Committee had done its duty, and the chances were the Council would agree with its report, but he was not prepared to vote right off on such a large scheme at present.

The PRESIDENT said the houses would be on the Society's hands next month, and it was desirable to begin operations quickly.

Mr. HAMPSON supported the suggestion of Mr. Evans. It was proposed to make very important structural alterations and changes, and if there were any criticisms to be made on the Committee's report, it would be well even in the interests of progress that the matter should be deferred for a month.

Mr. RICHARDSON supported the adjournment. It would be much better for all the members of the Council to inspect the plans before any further expense was incurred.

Mr. NEWSHOLME objected to the question being adjourned. If it were referred back to the Committee for a month the Council might as well do away with Committees altogether, and itself do the Committee work.

Mr. HAMPSON said there was no affront whatever offered to the Committee. Here was a proposal to spend £6000 or £7000, and he defied any member of the Council to give an opinion upon it upon such short notice.

Mr. HILLS, as a member of the Committee, said if the President saw no objection he should be only too happy to fall in with the views expressed. In expending this money it was only right that other gentlemen should have time to think over it.

Mr. ROBBINS also thought the proposition of Mr. Evans a very reasonable one. At the last meeting of the Committee he was surprised to find that several members of the Council not on the Committee were disposed to be more lavish in the expenditure than the Committee itself!

The PRESIDENT said he should not think of asking the Council to accept a proposition of this kind without full opportunity of discussing it in an informal way if it were wished.

Mr. ATKINS said if the Committee did not object there was no reason why the subject should not be adjourned unless there was a likelihood of losing important time in building. He was quite in accord with what the President had said with regard to the increased accommodation to be given to the Secretary.

Mr. MARTIN did not see the use of adjourning the question, unless the members who had spoken were inclined to remain in London and study the plans.

After some further discussion it was resolved unanimously to receive the report, but not to adopt it until next month.

RESEARCH.

This Committee had prepared a report, but as it had only been presented that morning, it was agreed that its consideration should be deferred till next month.

THE EXAMINATIONS.

The PRESIDENT said he had recently been in Edinburgh at the examinations, and had conferred with the examiners there, as on previous occasions, with regard to a new schedule of examinations. This subject had occupied the attention of the Boards of Examiners for about two years, and with the exception of a few alterations made by the Board of Examiners in Scotland, the schedule had been agreed to. He would suggest that it would be convenient that the General Purposes Committee be requested to consider this schedule at its next meeting, and that it should be circulated amongst the members of the Council before next month.

This was unanimously agreed to.

REPORT OF EXAMINATIONS.

January, 1889.

SCOTLAND.

	Candidates. Examined.	Passed.	Failed.
Major (16th)	2	2	0
Minor (16th)	10	7	3
,, (17th)	12	7	5
,, (22nd)	12	8	4
,, (23rd)	12	8	4
,, (24th)	11	8	3
	—57	—38	—19
Modified (24th) . . .	1	1	0
	—	—	—
	60	41	19

Preliminary Examination.

	Candidates Examined.	Passed.	Failed.
(8th)	315	156	159.

(25th). *Five* certificates by approved examining boards were received in lieu of the Society's examination.

HULL CHEMISTS' ASSOCIATION.

A letter had been received from the Hull Association thanking the Council for the *Pharmaceutical Journal*.

GENERAL PURPOSES COMMITTEE.

This report included the usual letter from the solicitor. Two defendants had paid the amount of penalty and costs, to prevent a trial. In some cases a difficulty had been found in obtaining the requisite evidence to found proceedings upon.

Other cases had been considered by the Committee, and in one proceedings were recommended.

The SECRETARY had submitted particulars of three limited companies recently formed for the purpose of carrying on the business of chemists and druggists, but in one case the shareholders had signed a memo-

randum stating that the company had not carried on business, and requesting that it be erased from the Register of Joint Stock Companies in accordance with the Act.

The Council as usual went into committee to consider this report; on resuming it was unanimously adopted.

EVENING MEETING IN EDINBURGH.

The third evening meeting in Edinburgh of the present session was held in the Society's House, 36, York Place, on Wednesday, January 30, at 8·30. Mr. William Gilmour, F.R.S.E., in the chair. The minutes of last meeting having been read and adopted the following communications were read:—

Suggestion for an Improved Chloroform Liniment.

BY PETER BOA.

The paper is printed at p. 625, and gave rise to the following discussion:—

Mr. Nesbit said he thought this new liniment was about perfect pharmaceutically, but it was not so clear that it was an improvement therapeutically. He rather thought it would be open to the objection that had been urged against all preparations having these hydrocarbons as a basis, namely that they were not readily absorbed when applied to the skin.

Mr. Lunan said the objection referred to by Mr. Nesbit had also occurred to him, and he would suggest that anhydrous lanolin might be tried. Otherwise the preparation appeared both an elegant and efficient one, and he thought they were indebted to Mr. Boa for a valuable practical suggestion.

Mr. Smith said he could confirm what had been said as to the liability of chloroform liniment to become rancid.

Mr. Macpherson thought the soft paraffin basis would have the advantange of retarding the volatilization of the chloroform to a greater extent than olive oil.

Mr. Hill said the effect produced in using chloroform liniment was largely due in many cases to the rubbing, and for this purpose soft paraffin was more suitable than olive oil. He also thought that the chloroform acted as a superficial stimulant rather than by absorption.

The Chairman said the two objections that occurred to him were the miscibility of the improved liniment with other liniments and the non-absorption of a hydrocarbon basis. The first objection had been successfully dealt with by the practical illustrations shown by Mr. Boa, and which seemed to indicate that the thickness of the liniment was in its favour. He could confirm what had been said as to the proneness of chloroform liniment to become rancid, a change which seemed to be due in some way to the chloroform.

Mr. Boa, in reply, said, with regard to the objection as to non-absorption, he thought the real object of the oil was to retard evaporation of the chloroform. He had submitted the liniment to a practical test and was able to testify that it acted very efficiently. He was glad to find that his observation as to the tendency to rancidity of the present liniment was corroborated by several of the speakers.

The next communication read was on—

Extract of Nux Vomica.

BY WILLIAM DUNCAN.

The paper is printed at p. 625, and gave rise to the following discussion:—

Mr. Dott said there could be no doubt that one washing with chloroform was not sufficient to remove the total alkaloid from a solution, and, if complete exhaustion was aimed at, Mr. Duncan's suggestion was undoubtedly an improvement. Of course the official test would be quite satisfactory if it was understood, not that the result indicated the total alkaloid, but that a certain test should always yield 15 per cent. This practical communication indicated one of the difficulties that must always attend any attempt to standardize galenical preparations.

Mr. Boa said he had also observed that extract of nux vomica, in place of being hygroscopic, always lost moisture and became harder. He thought some change took place in the extract on being kept. A fresh extract when used for tincture appeared to dissolve in the menstruum more completely than the same extract did after standing for six weeks or so.

Mr. Macpherson said he had always found that this extract lost moisture and hardened on keeping. As to the dry extract, Dr. Squibb had reported that there was exceedingly little demand for the abstract in America, so that it did not seem to have been appreciated. He thought the extract might be dried and then mixed with equal parts of glycerine and water, equivalent to the 15 or 16 per cent. of moisture in the standard extract. The glycerine would prevent loss of moisture, and thus the extract would remain constant.

Mr. Nesbit said his experience entirely corresponded with that of previous speakers as to the drying of the extract on standing. The new official extract was very free from oil, but perhaps the opalescence of the tincture referred to by Mr. Boa might be due to oil which, when old, became less soluble in spirit. He thought the new official extract was a great improvement on the old one, and this suggestion of Mr. Duncan's was a further step in the right direction. A dry extract would be very convenient for dispensing, and they might, also, perhaps have a standard fluid extract as well.

Mr. Lunan said he had also found the official method of estimating this extract defective. The dried extract would not be very convenient for making the tincture, and the amount of heat required to get rid of the last portion of moisture was objectionable. He would rather favour a standardized fluid extract.

The Chairman said this was a thoroughly practical communication, and he trusted Mr. Duncan might carry his investigation a little further and test whether or not the dried extract shown was satisfactory. He thought if any oil was present in the official extract it would naturally rise to the surface. This might be mistaken for moisture and might also account for the opalescence referred to by Mr. Boa in making the tincture, as the surface portion of the extract containing the oil would generally be used.

Mr. Duncan, in reply, said he did not confine himself to sugar of milk as a diluent, probably kaolin would be better. A fluid extract would be suitable for making the tincture, but would not do for pills, and consequently they must have a solid extract, and he thought a dry powder was best.

The last paper read was on—

The American Tinctura Quillajæ.

BY J. RUTHERFORD HILL.

The paper is printed at p. 626, and gave rise to the following discussion:—

Mr. Boa said he had had considerable experience with quillaia, and could corroborate the results and opinions expressed in this paper. He had found that the bark could be completely exhausted by maceration and percolation with cold proof spirit, and the resulting tincture kept well.

Mr. Macpherson said that having prepared the tincture shown, he might mention that the method he adopted in straining the decoction by the American process was to attach the strainer to the end of a long

tube. This of course was a much more favourable condition than would generally obtain in the process of straining as usually conducted. The tincture marked B might therefore be regarded as the best that could be obtained by the National Formulary process. He agreed with the author in thinking that the directing of quillaia bark to be in No. 20 powder in the B.P.C. Formulary was quite unnecessary. It was practically impossible to perform the operation of powdering in a mortar, and even in a mill it was only possible to reduce the drug to fine shreds mixed with a fine powder. The American plan of using fine chips was much better. The bark could be very readily torn into long thin strips, and these could be readily cut into pieces of about $\frac{1}{8}$th of an inch by means of a pair of scissors or, if on a larger scale, by a knife or root cutter. He also thought the alcoholic strength of the menstruum should be increased. He had observed that different authorities gave different molecular formulæ for saponin, and there seemed to be some doubt as to its real chemical composition.

Mr. Dott said there could be no doubt that the employment of heat was objectionable in all cases in which the active constituent of the drug was a glucoside, such as saponin. As to the chemical formula for saponin it was very difficult to speak with any certainty in the case of such bodies, which could only be obtained in an amorphous condition. With regard to the condition of the active constituent, and the degree to which decomposition had proceeded in the two tinctures, some useful information might be gained by examining them with the polarimeter.

Mr. Hill, in reply, said he had observed the discrepancies in the published chemical formulæ of saponin; and it had been suggested that there were probably several bodies possessing the characters of saponin, and forming a homologous series. He had disregarded these conflicting statements as being of no practical importance so far as the object of his paper was concerned. The suggestion of Mr. Dott, as to the polarimeter, indicated a method by which he might arrive at certain facts as to which he had had some difficulty.

On the motion of the Chairman, cordial votes of thanks were awarded to the authors.

Attention was then directed to the following donation to the Museum:—

Specimen of Salicin, in large prisms.

From MESSRS. T. and H. SMITH and Co., Edinburgh.

The thanks of the meeting having been awarded to the donors the meeting was closed.

Obituary.

GEORGE BURRELL.

Mr. George Burrell, J.P., one of the most widely known and respected Scottish pharmacists, died at his residence, Hillside, Montrose, on Thursday, Jan. 31, in the seventy-second year of his age. Mr. Burrell was a native of Wooler, Northumberland. After serving his apprenticeship there and acting as an assistant in Berwick, he came to Edinburgh as an assistant to Mr. H. C. Baildon, Princess Street. At that time he indicated his progressive views by taking a very active interest in the successful efforts made by the assistants and apprentices to shorten the hours of labour in Edinburgh. Subsequently Mr. Burrell went north to take charge of a business, which soon became his own, and which he afterwards carried on successfully for nearly fifty years. Mr. Burrell was a frequent contributor to the pages of the *Pharmaceutical Journal* on subjects relating mainly to pharmaceutical politics, and from 1871 till his death was local secretary to the Society. He was a man of extensive reading and considerable scientific attainments, and was held in high esteem by a wide circle of friends. He took a deep interest in local affairs, and was for a number of years a member of the Town Council and also Dean of Guild. He was elected a member of the first Montrose School Board, and at the second election he was appointed chairman, an office which he held for three years. Latterly he had been in feeble health, and had retired from active charge of the business.

Notice has also been received of the death of the following:—

On the 25th of January, Mr. Charles Frederick Bearpark, Chemist and Druggist, West Bank, Scarborough. Aged 30 years.

On the 25th of January, Mr. Richard Methuen, Chemist and Druggist, Deansgate, Manchester. Aged 47 years.

On the 27th of January, Mr. Thomas Kent, Pharmaceutical Chemist, Blackfriars Road. Aged 78 years. Mr. Kent was one of the founders of the Pharmaceutical Society, having joined it in 1841.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE PRELIMINARY EXAMINATION PAPER.

Sir,—Being much struck with the very small proportion of candidates, only four out of one hundred and twenty-two, who answered correctly the first question in arithmetic given at the recent Preliminary examination, I took the Journal containing it to the master of one of the Board schools here, who on seeing the question, informed me that it was one which came under Standard V. work. He also volunteered to give it out during the afternoon to his fifth standard, both boys and girls, and to send me the result. At the close of the day I received the following note:—

"Dear Sir,—Twenty-five children, Standard V., were set to do the sum placed in my hands. Twenty-one worked it correctly. The sum was not explained to them beforehand, and means were taken to prevent copying.

Yours, etc.————"

I may add that the children were not selected, but the sum was worked by the whole of the fifth standard present. Comment seems almost needless, but I may say that the above result merely confirms the opinion I have always held, that public elementary schools are unapproached at present as a means of furnishing the ground-work of a sound and useful English education. A most curious and interesting return might be furnished by the inquiry, if that were possible, as to where the above-named candidates had received their education. Judging from a comparison of results, I should decidedly say, not at public elementary schools. Ill would it fare with the head master of any of them who should be able to show no better results to H.M. inspector than such as were furnished in arithmetic at the late Preliminary examination.

Mexborough, Yorkshire. ROBERT J. SHIELDS.

In consequence of the length of the official reports this week the publication of several communications is unavoidably deferred.

W. J. S. Shepperd.—*Petasites fragrans* and *Eranthis hyemalis.*

Herbo.—We believe that a work entitled "Fox's Botanical Guide" is published by Potter and Clarke.

Williams, Eiffe and Co., ask for information respecting manufacturers of sunflower oil.

F. G. T.—The excipient for potassium permanganate pills, recommended by Mr. Martindale, is made by melting together equal parts of vaselin and paraffin, adding one part of kaolin and stirring until cold.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Baxter, Stark, Morris, Macdougall, Taplin, Ward, Duck, Hedges, Dott, Prosser, Unity.

ON THE PROPER TIME FOR COLLECTING ACONITE ROOT.*

BY P. W. SQUIRE, F.L.S.

Aconite root has been used in medicine for over a century, and is, at the present time, an important drug in the Pharmacopœia. In 1872 Dr. Squibb stated it as his belief that the use of the preparations of aconite root in therapeutics was much hindered in consequence of the great uncertainty attaching to the uniformity of the materials from which they were prepared, and recommended that only sound roots and those which cause the peculiar and characteristic numbing sensation should be used. In 1882, Mr. Holmes called attention to the unsatisfactory condition of the aconite root of commerce and stated that the bulk of the root was imported from Germany, where it was collected by peasants who did not possess botanical knowledge, and that it was sold without any guarantee that it was collected in winter or early spring. Indeed (he continues) it is difficult to understand how the root of *Aconitum Napellus* could be found before or distinguished after the leaves have appeared. As all the aconites likely to be mixed with *A. Napellus* flower much later than itself, he proposed that the official drug should be limited to home grown aconite, flowering in May and June, and gathered when the plant is in flower. In this way there could be no mistake about the species, and if the root were not gathered in its most active condition it would at all events have the advantage of being uniform in strength.

In 1882 Mr. Umney stated that large quantities at least 80 per cent. of the aconite roots, were, at that date, not obtained from *Aconitum Napellus*, but from a different species grown in Japan. In 1883 Mr. Groves recommended anyone setting about the preparation of nap-aconitine for internal administration to be very careful in the selection of his roots; if possible they should be grown in this country and guaranteed to be those of *Aconitum Napellus*.

As I could obtain at any time of the year a supply of *Aconitum Napellus*, Mr. Holmes in 1887 suggested that I should examine the root at different stages of its growth, with a view of arriving at the best time for collecting it, and my sister kindly arranged to send me from her farm in Bedfordshire some plants of *Aconitum Napellus* at intervals of a month, or more frequently as occasion required.

I commenced at the end of September, 1887. The plant stems of that year were dead and the roots from which they had arisen had decayed, but in the ground, close by them, though unattached to them, were new strong healthy roots.

One of these, as a sample, measured in length $3\frac{1}{2}$ inches, and its greatest breadth $\frac{7}{8}$ inch, tapering to $\frac{1}{8}$ inch; the crown terminated above in a short blunt point.

It possessed eighteen rootlets, varying in length from 2 to 5 inches, most of them over 3 inches. The roots varied somewhat in size and shape: some were shorter and less tapering than the root described, whilst others were longer and more tapering.

A transverse section, about $\frac{1}{2}$ inch in diameter, taken about the middle of the root, had the following characters. When looked at with the unaided eye or with the help of a pocket lens it appeared to be divided roughly into three portions, a relatively large amount of pith enclosed by a narrow characteristic stellate band. In some roots this is strongly angulated in the form of a star, and in others less so. The angles also vary somewhat in their number in different roots, also in different parts of the same root. Exterior to this star-like portion was a broad zone which was much less transparent than the pith, and outside this again was another zone which was more translucent than either of the other two portions. The whole was enclosed by a brownish coloured line of cells.

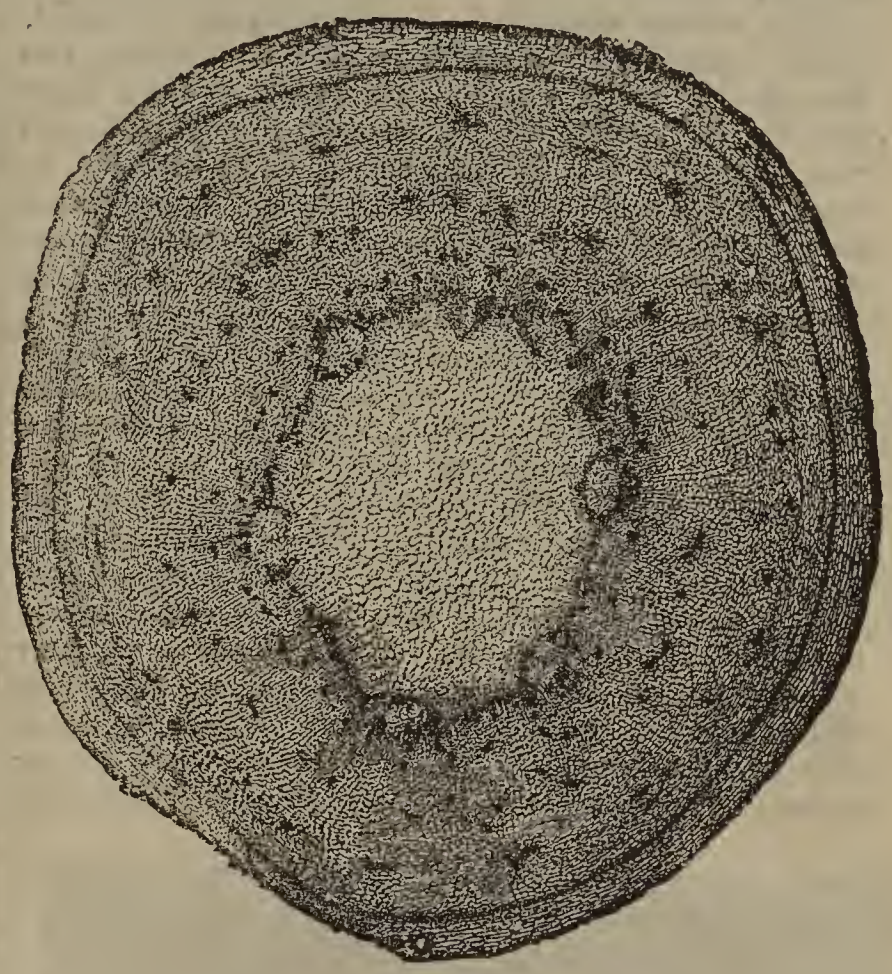


Fig. 1.—Transverse section of root of *Aconitum Napellus*. Magnified 7 diameters. From a Photograph.

Examined under the microscope the pith was seen to consist of parenchymatous cells, which were more or less circular and had an average diameter of ·13 millimetre; they contained numerous starch granules, simple and compound, which varied considerably in size, but the bulk of them were between ·015 and ·025 mm. The narrow angular band was the cambium layer, on the pith side of which occurred numerous vascular bundles. The stellate appearance of the band was due to a development of parenchyma immediately on the exterior of a primary vascular bundle and enclosed on two sides by two plates of tracheæ which opening outwards formed an angle, the apex of which was the vascular bundle; the cambium layer was thus pushed outwards on a line convex to the cortex and enclosed the new parenchyma.

The less transparent zone was the bast, and consisted of parenchyma cells which near the cambium had an average diameter ·07 mm., but were larger near the endodermis, having an average length ·12 mm. and breadth ·06 mm. These cells, like those of the pith, were filled with starch, but the granules were smaller, the average size being ·008 to ·016 mm., and interspersed in the parenchyma were numerous primary and secondary sieve

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in London, Wednesday, February 13.

bundles. These are shown in Fig. 1 as dark dots.

The bast was enclosed by a well-marked line, the bundle-sheath, and this separated it from the cortex, which was the very translucent portion.

The cortex consisted of parenchymatous cells, which varied exceedingly in size and shape, the largest cell being four or five times greater than the smallest. The size of the majority of the cells was ·09 to ·18 mm. in length and ·06 to ·08 mm. in breadth. Also seen in the cortex were several stone cells (sclerenchyma). In vertical sections the fibro-vascular bundles were seen to traverse the whole length of the tuber-root, but they presented a different appearance in transverse sections taken at different parts of the same root. Those taken near the small end of the root exhibited the tracheæ in a more or less complete circle, but as one approached the broader portions of the root the tracheæ were seen to diverge ; the stellate appearance also changed. I have found roots which had a six-rayed star at the narrow end show a seven or eight-rayed star in the broad part near the crown. A large number of sections cut from different roots exhibited the star as varying from five to eight rays, but the majority were six or seven; some sections from the rootlets had four rays.

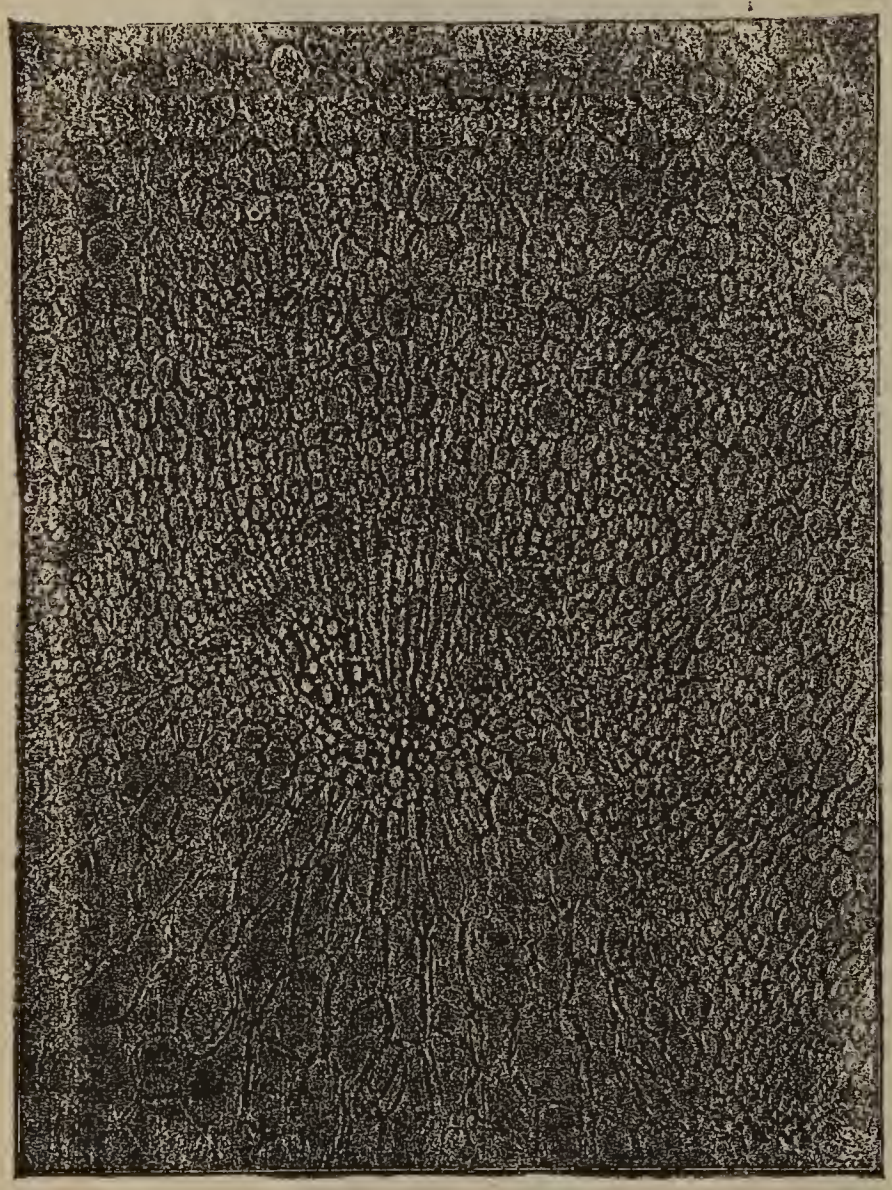


Fig. 2.—Transverse section of root of *Aconitum Napellus*, showing one of the characteristic angles. Magnified 36 diameters. From a Photograph.

About the end of December the blunt-pointed apex of the tuberous root enlarged and showed a stem-bud, which opened and formed the first little leaf at the end of January. By the beginning of March it threw up a fragile stem about 9 inches high, and at the side of the crown of the root, a small daughter root was forming. From this period in the life of the plant, when the leaves open out, the parent root from which the stem had arisen, deteriorated, and the starch granules gradually disappeared. In April the pith disintegrated and became hollow in the centre, and in May the root presented a slightly shrivelled appearance and decay gradually proceeded, until in August the root was rotten, and nothing but the stronger tissues were left.

On the other hand, the new daughter root grew stronger, formed rootlets, and arrived at maturity about the following August or September, and remained in a resting condition until it threw up a stem in the spring and went through the same stages as the parent from which it was derived. In the daughter root the starch granules were observed in quantity about the middle of April.

On each occasion when cutting sections of the roots I applied the tongue to the cut surface, and the strongest and most lasting effects were produced by roots gathered in the autumn and winter; that is, in roots which had not commenced to open the stem-bud. But the mother root tasted in June produced scarcely any effect upon the tongue.

It is stated in the 'Pharmacographia' that the fibrovascular bundles of aconite root are devoid of true ligneous cells, but I have treated a large number of sections with acidified aniline chloride and acidified phloroglucin, and in each case the tracheæ gave the reaction for lignin very distinctly.

I noticed that the young daughter roots, when cut transversely, turned pink on the cut surface much more rapidly than the more mature roots.

Nearly all my experiments have been made with plants obtained from the farm in Bedfordshire, but as a control, Mr. Holmes kindly furnished me last autumn with roots which he had obtained from five different sources. Of these I cut sections which yielded results quite in accord with my previous experience.

I wished to see what effect was produced on a plant by cutting away the greater portion of the large root soon after the formation of the small daughter root.

At the end of March an early forward plant was selected. It had a strong stem about a foot high, and the crown of the root measured $1\frac{1}{8}$ inch in diameter ; the daughter root was 1 inch long and less than $\frac{1}{4}$ inch in diameter, and had no rootlets.

The parent root was cut off close under the crown, leaving the daughter root attached to the plant, and this, minus the greater part of the parent root, was planted again without delay. This plant examined at the end of May was flourishing, the small daughter root had grown to be 2 inches long with thirty-four rootlets, the longest 6 inches, and most of them over 2 inches in length ; some small weak rootlets had also started from the fibrovascular bundles in the cut surface of the old crown.

Another, but smaller, plant was treated in the same way at the same date, and at the end of May it was healthy and vigorous, the daughter root had grown to be 1 inch long, the crown being $\frac{1}{2}$ inch in diameter, and it possessed seventeen rootlets 2 to 3 inches long.

At the same time that the above experiment was proceeding, some other roots were cut transversely into pieces about $\frac{3}{4}$ inch long, each of them having rootlets, and twenty such pieces were placed in good

yellow loam mould and kept moist in a cool glass house. They were examined at the end of May: the pieces had not altered in size, and no new rootlets had been formed, but from the upper or stem end of the sections six of the pieces had thrown up slender leaf stalks from 1 to 3 inches long and five more pieces had formed rudimentary shoots.

It would appear from what I have already stated that the root is most active in the winter months, before the leaves and stem are formed, yet it is very common to find aconite roots described as having the remains of the stem attached, also as being slightly hollow in the centre. This in itself would account for a great difference in strength, even supposing that no other roots but those of *Aconitum Napellus* were used.

The British Pharmacopœia gives the following characters, the italics being mine:—

"The root of *Aconitum Napellus*, collected in the winter or early spring, *before the leaves have appeared*, from plants cultivated in Britain, and carefully dried; or imported in the dried state from Germany. Usually from about 2 to 3 inches long, from ½ to ¾ inch thick at the upper extremity, where it is usually *crowned with the remains of the base of the stem*; conical in form, much shrivelled longitudinally, and more or less covered with the scars or bases of broken rootlets; dark brown externally, whitish within, and having a central cellular axis with about seven rays. No marked odour; taste at first somewhat bitterish-sweet, but exciting slowly, when chewed, after some minutes a sensation of tingling and numbness which lasts for some time."

In Bentley and Trimen's 'Medicinal Plants,' aconite root is stated to be most active in the winter months and early spring, *when the leaves are absent.* When dried it is conical in shape, 2 or more inches long, ½ to 1 inch thick at the upper end, *where it is crowned with the remains of the stem.*

There is an obvious inconsistency in the parts italicized, as there can be no remains of the stem *until* the leaves have appeared; and any specimen which shows the remains of a stem must be more or less exhausted, depending upon the extent to which the growth of the plant had proceeded.

The description in the U.S.P. is much the same as the British, but there is no reference to the remains of the stem.

The conclusions at which I have arrived are:—(1) that the root arrives at maturity in the autumn, when it has attained its maximum size, the tissues being then complete, and the tuber root full of starch; (2) that the numbing sensation produced upon the tongue is most pronounced in roots which are gathered at this period.

The cause of the numbing sensation, which I assume to be aconitine, seems to be stored up in the plant coincident with the starch. Whether it serves some useful purpose in the nourishment of the stem and leaves of the plant is uncertain, but I noticed that as the stem grew, and the starch disappeared from its root, so also that root was less powerful in producing the numbing sensation.

I may mention that whereas the root of *Aconitum Napellus*, if fresh cut and applied to the tongue, produces a powerful characteristic and persistent numbing sensation, the root of *Aconitum paniculatum* produces no such effect.

When should the roots be collected?—The roots of these plants should be collected in the autumn when the root is in perfection, and when there would be no difficulty in separating the old decayed roots. But the roots of *Aconitum Napellus* differ in appearance and microscopic structure as much from one another as they do from *Aconitum paniculatum*; consequently, it would not be possible to distinguish with certainty and separate from one another a mixture of the two roots except by taste, nor would it be possible in digging up roots in the autumn to distinguish the one from the other. It would be equally impossible for the herb gatherer to taste each individual root. As, however, *Aconitum Napellus* is in flower some little time before *Aconitum paniculatum*, it would be quite easy to distinguish the plants in the summer. Therefore I should suggest that the places where *Aconitum Napellus* abounds should be taken note of, and marked in the summer when the plants in flower can be recognized. Whether this plan is practicable on a large scale in the wild condition of the plant I do not know, but it certainly is in the cultivated state, and any stray *A. paniculatum* can be weeded out.

The cultivated root would no doubt be much higher in price than the wild, as it takes a great number of roots when dry to weigh a pound, and labour is probably dearer in England than where the German roots are collected. But the increased cost would be compensated for by the certainty of having the right plant gathered at the best time.

I do not think that *Aconitum Napellus* is cultivated in England at the present time in anything like sufficient quantity to supply the drug market, but should a large demand arise for cultivated aconite it might afford an opening for the British agriculturist.

[*The discussion on this paper is printed on p.* 652.]

THE CONGEALING POINT OF OIL OF ANISE.*

BY JOHN C. UMNEY.

The commerce of oil of anise would seem to have changed materially since the time when the editors of the Pharm. Lond., 1851, wrote: "Anise oil is stated to be adulterated with oil of star-anise, which is sometimes sold for that of anise."

At the present time by far the greater portion of anise oil of trade is that of star-anise; indeed, I am informed on very high authority that for every pound of "aniseeds" oil (*Pimpinella Anisum*), one would meet with a thousand pounds or even more of "star-anise" oil (*Illicium anisatum*). That star-anise oil was largely imported as far back as 1838 is certain from reference to a circular issued in that year on the authority of the "Druggists' Club," on the import of drugs (and among them star-anise oil) from China and the East Indies, and the conditions on which they should be sold on entering the Port of London. I have no exact information as to whether the oil was used at that time for pharmaceutical or confectionery purposes. I have learned from my father that it was formerly the custom to mix much of the star-anise oil sold in

* Read before the Pharmaceutical Society of Great Britain, at an Evening Meeting in London, Wednesday, February 13.

the Port of London, in large cisterns, which process was termed "working," and according as this had been performed or not the product was sold by brokers as "worked" or "unworked" oil. This manipulation has of late years been looked upon as unnecessary, and I think rightly so, for a recent examination of trade samples obtained from ten London wholesale druggists proves conclusively that unusual uniformity exists, and that "bulking" the oils, whatever may have been the case half a century ago, is now unnecessary (see Table B.).

I will read extracts from British and other Pharmacopœias, showing the varieties of anise oils official at different periods. I will also give the leading features of these oils as described by Flückiger and Hanbury in 'Pharmacographia.'

Pharm. Lond., 1851.—(Pimpinella oil only official).—"This oil is stated to be adulterated with that of star-anise, which is sometimes sold for that of anise. Oil of anise concretes at 50° F., whilst star-anise oil is liquid at 35° F."

Pharm. Brit., 1864. (Both varieties official).—"Oil of anise distilled from the fruit of *Pimpinella Anisum*; also oil distilled in China from the fruit of *Illicium anisatum*; congeals at 50° F."

Pharm. Brit., 1867.—Exactly the same as 1864.

Pharm. Brit., 1885. (Both varieties official).—"Oil distilled in Europe from anise fruit, or in China from star-anise fruit. The ordinary oil of anise congeals at temperatures between 50° and 60° F., and may remain solid at 62° to 65° F. Oil of star-anise only becomes solid at a few degrees above the freezing point of water."

United States Pharm. (Both varieties official.) "Distilled from anise or illicium.—Anise (Pimpinella) oil has a specific gravity ·976 to ·990, increasing by age. At 50° to 59° F. it solidifies to a crystalline mass which does not resume fluidity until temperature rises to about 62·6° F. Oil of illicium has nearly the same properties, except that it congeals at about 35·6° F."

Pharmacographia (1st. edit.).—"The essential oil of aniseed may readily be confounded with that of star-anise. These oils agree so closely in their chemical and optical properties, that no scientific means are known for distinguishing them. The essential oil of aniseed solidifies to a hard crystalline mass at 50° F. (10° C.) to 59° F. (15° C.), which does not resume its fluidity till the temperature rises to about 62·6° F. (17° C.)."

"The oil of star-anise usually solidifies below 35·6 F. (2° C.)."

From these quotations you will perceive that the opinions of all the authorities are almost identical, viz., that "pimpinella" oil congeals between 50° F. and 60° F., whilst star-anise oil congeals at about 35·6 F. (2° C.). Before I analyse these official statements I think it would be well if we had an understanding as to the meaning and intention of certain words that are common to most of the authorities quoted.

The word "congeal" seems to be used in recent editions, while formerly the word "concrete" was used. We shall agree that these terms, as well as the word "solidify," are practically synonymous.

Then comes the question, how have these congealing points been arrived at?

Either (1) they must have been determined by exposure of the oil at rest to the low temperatures recorded, but with the thermometer not actually immersed in the fluid, or (2) the statements as to the solidifying points must have been based on one common authority, who, it would seem, fell into an error in its determination.

This latter explanation appears the more likely when one views how very exactly the statements of the United States Pharmacopœia and 'Pharmacographia' coincide.

I can also only think that those who had charge of the compilation of the British Pharmacopœia, 1885, had not the opportunity of determining (in the absence of authentic specimens in the museum of this Society) the congealing point of anise oils, and that therefore they were compelled to rely for their information upon the published statements of their predecessors and others. (The oils with which I have experimented were distilled by me, that of pimpinella from Russian aniseeds, and the illicium from true star-anise fruits imported from China. Comparative experiments were made with oils of German distillation obtained direct from the producers, and star-anise oil of direct import from Macao, China.)

Before I allude to the changes that take place at the moment at which anise oils solidify, I should like to refer to the well-known fact that some liquids, such, for example, as water, saline solutions, etc., when at absolute rest are capable of being cooled many degrees below their normal point of congelation without becoming solid. But when a liquid solidifies after being cooled below its normal freezing point, the solidification is accompanied by a disengagement of heat, which is sufficient to raise its temperature from the point at which solidification begins up to its *ordinary or true congealing point*. This physical law and its application to anise oils is the key-note of my communication this evening. The solidifying points of star-anise oil hitherto quoted have been *abnormal ones*, due to their determination whilst the fluid was at rest. The *true congealing point* is the temperature to which the thermometer immediately rises, on this solidification taking place. The oil of pimpinella does not present such a marked difference in respect of its *abnormal and true* congealing points, but as I will proceed to show, that of star-anise presents a strange dissimilarity.

Table A.

Source of Oil.	Abnormal solidifying point.	True solidifying point.	Colour reaction with alcoholic HCl.
	Fahr.	Fahr.	
Star-anise (German)	31	52	Yellowish-brown.
Star-anise (own distillation) .	24	49	Yellowish-brown.
Star-anise (direct import from Macao, China)	34	56	Pale brown
Star-anise (broker's sample)	36	54	Brown.
Anise fruit (German)	50	59	Manganese pink.
Anise fruit (own distillation) .	50	59	Manganese-pink (fading quickly).

Table A will, I think, show that the margin allowed by the Pharmacopœia for the pimpinella oil, viz., from 50° to 60° F., is practically the difference between the abnormal and normal solidifying points,

and is therefore correct, but that the congealing point quoted for star-anise oil is its *abnormal one*, and is therefore, I think, incorrect. Moreover that between the true or *normal* solidifying points of pimpinella and illicium oils there is practically no difference, and it is only between their *abnormal* congealing points that a wide divergence exists.

How then are we to frame "characters and tests" that will distinguish these oils? Either (1) we must say, that the solidifying point, taken when the liquid is at rest, of "pimpinella" oil is about 50° F., whilst "illicium" oil is about 35° F., *i.e.*, their *abnormal congealing points*, which, to my mind, has the disadvantage of being somewhat unscientific; or,

(2) We must find some easily applied distinguishing test. The one I would suggest is that proposed by Eykmann,* which I have found most efficient, viz., a saturated solution of hydrochloric acid gas in absolute alcohol, which reagent affords with "pimpinella" oil a beautiful manganese pink, whilst with "illicium" oil, only a pale brown colour is shown, as will be seen by reference to Table A. The test is more strikingly apparent with the "natural" oils, than with oils that have been subjected to rectification, but even in the latter case, it is still sufficiently delicate to admit of no confusion.

In 'Pharmacographia,' 1st edit., page 278, the authors write: "We are unable to give characters by which these oils can be discriminated, although they are distinguished by dealers."

With the authentic specimens, which I have placed on the table, I am convinced there are very few in this room, who possess anything like a delicate olfactory organ, who cannot with ease distinguish between the one and the other; indeed, there may be dealers in this room, who would blindfold distinguish between aniseeds and star-anise oils.

Table B.

(*Indicating Examination of Trade Samples*).

Sample.	Abnormal solidifying point.	True solidifying point.	Colour reaction with alcoholic HCl.
	Fahrenheit.	Fahrenheit.	
No. 1.	31	54	Almost colourless.
No. 2.	34	53	,, ,,
No. 3.	33	53	,, ,,
No. 4.	38	54	,, ,,
No. 5.	39	57	,, ,,
No. 6.	36	54	,, ,,
No. 7.	31	54	Yellowish-brown.
No. 8.	35	57	Almost colourless.
No. 9.	39	58	Yellowish-brown.
No. 10.	39	56	Almost colourless.
Average of 10 samples	35·5	55	

The "pimpinella" oil, you will note, has a peculiar fatty smell, quite absent from the "illicium" oil. Part of this peculiar odour, is, I am aware, removed commercially by fractional rectification, but even after this process the odour is unmistakable. Summarizing, then, I would suggest that some modification of the characters and tests of the Pharmacopœia be made in future editions, presuming, of course, that the compilers consider it of sufficient importance to distinguish between the two oils. Judging from the text of the present edition, they do think this desirable, and therefore I would suggest the "characters and tests" in the future should embody the points I have raised, and which I trust I have conclusively proved.

[*The discussion on this paper is printed on p.* 654.]

* *Pharm Journ.* vol. xi., p. 1046.

NOTE ON CASCARA SAGRADA.*

BY JOHN MOSS, F.I.C., F.C.S.

Since Dr. J. H. Bundy, of Calusa, California, published his first short paper in 1877, this drug has made almost unparalleled progress in favour as a laxative. For some years the progress was slow and uncertain; from 1883, however, it has been steadily accelerating, until at the present time there is hardly a pharmacy or dispensary in which some preparation of cascara cannot be found.

No doubt the abundance of the drug, ease of collection, and consequent low price, have been prime motors in giving it the impetus now acquired, an impetus more than justified by its undoubted usefulness and certainty of action in cases of either accidental or habitual constipation. The collection became general, and continued to be remunerative, until a point was reached when the article outgrew the demand for it and competition between collectors brought down the price to a point which no longer paid even the small expenses of collection and transport. To speak in commercial phraseology, operations relaxed and prices stiffened; meanwhile consumption grew. But dealers offered only a small advance on previous low prices and collectors were not induced to make the usual general harvest in the spring of 1888. The season was an extremely bad one, blizzards and rain interfering seriously with the slackened attempts at collection, and the available supply was so seriously reduced that prices advanced rapidly until the present time, when they are fully six times as great as they were a year ago. There is every prospect that before the harvest of 1889 can be placed on the market in October next, prices will be still further enhanced.

When a natural product becomes scarce and of high value one need not wait long before the search for a substitute results in alleged discovery. If the latter be offered on its merits and without any attempt to deceive, nothing can be said in question of the morality of the offer. But this is not universally the case. It sometimes happens that the substitute is put forward under the name of the more-esteemed original.

Something of this kind has happened lately in relation to cascara, and we have advices that about 6000 lbs. of spurious cascara have been placed on the New York market, and that some of this parcel will shortly find its way to London. Forewarned is forearmed. Through the kindness of my New York correspondents, Messrs. Schaelkopf, Hartford, and Maclagan, I have received a specimen of this spurious cascara, and my friend, Mr. Samuel Lambert, has within the last day or two handed me two specimens of cascara admittedly gathered out of season. I am also indebted to the gentleman just named for a specimen of Oregon cascara. So far as I am aware no supplies of any of these varieties have arrived in England.

* Read before the Pharmaceutical Society of Great Britain, at an Evening Meeting in London, Wednesday, February 13.

This communication will therefore, I trust, be the means of placing pharmacists on their guard.

As to the characteristics of the true and false cascara, for the sake of comparison I submit specimens of four samples.

1. *True Cascara.*—The British Pharmacopœia description of this is very full and complete, and has been made more accurate in the latest reprint by the omission of the statement that it has "no marked odour." The odour is, indeed, very faint and delicate, but it is quite marked and distinctive. The best bark occurs in thin flat pieces, more or less square, and these as well as the quills, which are thicker and of older growth, exhibit a feature of great importance not mentioned in the Pharmacopœia. This is the smooth, shining, glazed inner surface, rendered more obvious by passing the finger over it. I have not yet met with the flattened packets referred to in the official description, nor conversed with anyone who has seen them.

2. *Oregon Cascara.*—This is in bold, handsome quills from one-sixteenth to one-eighth of an inch thick, with a beautiful silvery outer surface, marked by foliaceous and other lichens, and is sometimes mossy. The surface is easily removed, and its removal exposes a thin brownish layer under which the green of the chlorophyll cells is very distinct. The fracture is short and slightly fibrous internally as in No. 1. It has the same odour and taste as No. 1, but is perhaps slightly less bitter and more mucilaginous. The inner surface is much lighter than No. 1, being a pale dull cinnamon brown. It is also fairly smooth. Before seeing it I was informed that it was medicinally inert. When the specimen on the table came to hand I thought it desirable to test the accuracy of this statement, and accordingly swallowed a decoction made from thirty grains of it. Though quite disposed to regard my information as correct the personal experiment resulted in a slow but deepening impression that it was decidedly erroneous, and in the course of a few hours I became conclusively convinced that Oregon cascara was anything but inert. Its action is similar to, if not identical with that of Californian cascara of good quality, and is worthy of further study by practised therapeutists, especially as this drug is less bitter than the better known variety.

3. *Cascara "out of season."*—This, whether it be cut from the tree with knives, or scraped from the twigs, occurs in small irregular incurved pieces, which may be as much as 2 inches in length, but is mostly much smaller, and from one-thirtieth to one-sixteenth of an inch thick. The outer surface is a dark dull earthy brown, with a greenish tinge and occasional small round lichens on it. The inner surface is very varied, sometimes paler than No. 2, sometimes a deep uneven brown, and broad bundles of fibres may be easily detached from some of the pieces. Thin strips of silvery white wood are adherent in places, showing that the bark was incapable of being perfectly stripped at the time of collecting, and had to be cut away. The fracture corresponds to No. 1, but the taste is very slight, being scarcely bitter with a suggestion of sweetness. The odour is less heavy than that of the drug which has been collected at the proper time.

4. *Cascara "spurious."*—Generally speaking, this presents characters similar to No. 3, but is much bolder, occurring in quills and incurved pieces, the former as much as 5 inches in length, the latter irregular as to size, but somewhat thicker than the quills, which are not more than one-twentieth to one-sixteenth of an inch thick. There are at least three different kinds of bark in the specimen, or if of the same kind, then they are from different districts, if we may judge from the different characters of the outer surfaces and the nature of the parasites upon them. The collective odour is suggestive of cascara, but is slightly sharper and more aromatic. The taste is very slightly astringent and not markedly bitter. The inner surface is roughly fibrous, and several of the pieces have adherent sections of wood, as though they had been partly cut and then forcibly torn from the tree. I have submitted the specimen to Mr. Holmes, and he is unable to identify it, though assured it is a *Rhamnus.* Taking all the characters into consideration and comparing this specimen with No. 3, I am decidedly of opinion that like the latter, No. 4 is true cascara collected out of season. If I am right, and any considerable quantity is collected, the outlook for seasonable cascara is not encouraging. It is a case of killing the goose which lays the golden eggs, and the cascara trees of the Pacific coast will meet the fate of the cinchonas of the western slopes of the Andes. I have not yet tried the personal experiment with No. 4, but if any gentleman is desirous of doing so, I shall be pleased to afford him the opportunity when the larger sample which has been applied for comes to hand.

[*The discussion on this paper is printed on p.* 657.]

MELTING POINT AND CHEMICAL COMPOSITION OF BUTTER AS AFFECTED BY NUTRITION.*

BY A. MAYER.

The examination of butter produced by cows under various conditions was undertaken to explain if possible why Danish butter has a better sale than Dutch in the English markets. All that was known on the subject was that the Danish is harder and of a better colour. Inquiries showed that whereas in Holland the cows were fed on pasture and calved in spring, in Denmark they, for the most part, drop their calves late on in the year, and are house fed. The cows under examination were fed at various periods on roots, hay, grass, clove and silage, and the analysis of the butter produced showed that the percentage of volatile acids varies as the specific gravity; that the melting point does not march parallel with specific gravity, but is dependent on the percentage of the oleins, butyrin, capronin, etc., present; the percentage of volatile acids and the specific gravity of the butter produced by any one cow varies more considerably than is generally supposed when the experimental conditions are changed; the percentage of volatile fatty acids is dependent on the period of lactation, rising as the period progresses, but it is also dependent on the feeding, being highest when roots, meadow-grass and clover are given, and lowest with ensilage; on the contrary, ensilage and hay produced a butter of high melting point, whilst grass or clover, whether as pasture or given cut in the house, lowers the melting point; the solidifying point follows the melting point, rising and falling with it.

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* From the *Landw. Versuchs-Stat.*, 1888, 261-282. Reprinted from the *Journal of the Chemical Society*, February.

The Pharmaceutical Journal.

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THE MEDICINE STAMP ACT.

IT is now more than a year ago that opportunity was afforded for chemists generally to consider their position in regard to the statute commonly known as the Patent Medicine Act. That opportunity was furnished by the publication of a correspondence between Messrs. MACFARLAN, of Edinburgh, and the Commissioners of Inland Revenue, which dealt with the matter in such a thorough manner as to leave scarcely any possibility of misunderstanding in the future. It would appear, however, that the information then given has been so far disregarded by the chemists of Newcastle and its vicinity that precisely the same inconveniences are now being experienced by them in consequence of the Inland Revenue authorities putting the law in force in cases where they consider the provisions of the Act are not complied with. Some days ago a circular was sent out by Messrs. ISMAY and SONS stating that in view of the action taken by the Inland Revenue authorities during the last few weeks, relative to the sale of Dale's Plaister, and other articles which are held liable to stamp duty, it was thought desirable to convene a meeting of chemists to consider what line of action should be decided upon, and urging the chemists in the neighbourhood to attend, so as to make the meeting thoroughly representative. The result has been that a meeting was held last Wednesday evening at the County Hotel, Newcastle. Mr. FORD, of the firm of Messrs. ISMAYS, stated at the opening that in consequence of the action of the Inland Revenue authorities such a sense of insecurity was felt by the trade that it was advisable to consider what should be done as to organizing measures for defending many cases of prosecution, or for the entire repeal of the law relating to patent medicines. Mr. PROCTOR was elected to preside over the meeting, and in his address gave some historical account of the discussions that had taken place on the subject during the last twenty-four years. Referring to a former letter of his in this Journal, he expressed the opinion that the position is the same at the present time as it was then, that chemists avoid the law, and keep off from medicines those instructions and recommendations and directions for their use which are valuable to the patient, and which ought to be upon medicines. He thought the law should be made clear, so that any man with a good intention could understand it, or else that it should be modified so that there should be no difficulty in saying whether or not any medicine should be stamped. So far as abolition of the law was concerned he did not entertain any expectation of that being effected, but modification was, he thought, possible, and perhaps a halfpenny stamp might be introduced.

We cannot avoid pointing out in regard to these remarks that they seem to be very wide of the question now at issue. If chemists avoid the law, as Mr. PROCTOR says, they do not become subject to its provisions, and there could in such case be no ground for prosecution. But is that the case? The use of labels with directions for using medicine is only one of the conditions which entail liability to stamp duty, and the instance of Dale's Plaister in Messrs. ISMAYS circular shows that such liability results from the designation of the medicines sold just as in the case of the Scotch chemists. That liability may be simply avoided by altering the designation, as suggested by the Inland Revenue authorities, and it might have been expected that the publicity given to that suggestion a year ago would have induced chemists to protect themselves from interference by adopting the alteration. At that time it was distinctly stated that the Inland Revenue authorities held the use of the possessive case to indicate proprietorship, which is by the Act a condition of liability to stamp duty, and it was also stated that in the execution of their duty as collectors of revenue it was their intention to enforce that view of the matter. We fail, therefore, to perceive what ground of complaint there can be against the Inland Revenue authorities if they carry out that intention. Whether the law should be repealed is another question, and it does not appear that there is any sufficient ground for raising it. The only alternatives seem to be to comply with the provisions of the Act, either by using the stamp or by avoiding liability to stamp duty, and, failing that, to have a case tried with a view to obtaining a judicial decision whether the interpretation of the Act by the Inland Revenue authorities is to be upheld or not.

A course of four lectures on the Venom of Serpents and Allied Poisons, by Dr. Sidney Martin, is announced to be delivered at the Royal Institution on Thursday, February 21, and three following Thursdays, at 3 o'clock. Lord Rayleigh also is to give a course of eight lectures on Experimental Optics, dealing especially with Polarization and the Wave Theory, on Saturday afternoons at the same hour, commencing on Saturday, February 23.

* * *

The fifth monthly meeting of the Midland Counties Chemists' Association will be held on Tuesday evening, the 19th inst., at half-past eight o'clock, when the adjourned discussion on Mr. W. Jones' paper on "Moot Points in the Dispensing of Prescriptions" will be opened by Mr. F. H. Prosser, with remarks on chlorodyne and the variability of colour of certain scale preparations.

Transactions of the Pharmaceutical Society.

EVENING MEETING IN LONDON.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT, IN THE CHAIR.

An evening meeting of the Pharmaceutical Society was held on Wednesday, February 13, at 17, Bloomsbury Square, the chair being taken by Mr. Alexander Bottle, Vice-President, at 8 o'clock.

The first paper read was—

On the Proper Time to Collect Aconite Root.

BY P. W. SQUIRE, F.L.S.

The paper is printed at p. 645, and gave rise to the following discussion :—

Mr. Greenish expressed his gratification at a subject being brought forward which was so interesting to every pharmacist. Mr. Squire had stated very properly that the aconite root obtained from Germany was mostly of a character scarcely fit for use in pharmacy, and it was extremely difficult to say whether it was from *Aconitum Napellus* or from any other species. One of the most eminent of histologists, Professor Vogl, was so alive to the importance of this subject that he made an excursion into the mountainous country running through Austria with a view of obtaining the *A. Napellus*, and he found that it was only at an elevation of 6000 feet that this variety grew to any appreciable extent. Lower down, at about 2000 feet, he met with quantities of other species of *Aconitum*, and especially with hybrid forms. In conjunction with Dr. Schneider, Professor Vogl wrote a commentary on the Austrian Pharmacopœia, and there expressed the opinion that the root *A. Napellus* was the kind that should be used, as it could be obtained, though there might be some difficulty in doing so. Then the question arose whether the wild or the cultivated plant contained the most active principle, and on this point an investigation was made by Professor Vogl and Dr. Schroff and his son, the latter gentlemen paying attention to the medicinal and chemical, and Professor Vogl to the histological side of the question. They all came to the conclusion that the wild plant was the stronger, and that there would not really be much difficulty in obtaining it. He hoped that when Mr. Squire next read a paper of this kind he would illustrate it more completely, for it was very difficult for any one not an histologist to understand what was meant by parenchymatous tissue, wood cells and so on. If the section shown had been larger and been accompanied by longitudinal sections the paper would have been more interesting and instructive. Mr. Squire depended very much on the tongue test, and no doubt to a certain extent that might be relied on ; but it sometimes happened that the starch became converted into a saccharine principle, and it was possible that in the application to the tongue the aconitine might be masked by a small quantity of saccharine principle. When engaged some time ago on aconites he obtained some of the Japanese aconite, and was probably misled by the starch, for at the end of an investigation lasting some months he felt convinced that the Japanese aconite was not so strong as average German specimens ; but it was stated most distinctly by Mr. Umney at the Conference that the Japanese was the stronger of the two. He therefore thought there was some risk of inaccuracy if the taste alone were relied on. His own opinion was strongly in favour of the wild grown aconite; but there was much to be said in favour of the cultivated, as you knew what you were dealing with. He hoped that before long the respective value of the wild and cultivated roots would be determined in the Research Laboratory. He congratulated Mr. Squire heartily on the paper, though he had criticised it in some respects.

Professor Green said he was not surprised to find that Mr. Squire was not able to identify *A. Napellus* by the structure of the root; it would have been strange if he had, seeing that the structure of roots varied so much. He hoped to have heard something which might throw a light on the histological question, whereabouts in the root the active principle resided ; whether it was in the exterior parts, in the fibro-vascular system, or where. If Mr. Squire could help botanists in that direction, it would probably throw a light on certain problems connected with the formation of aconitine in the life history of the plant, though this might be more interesting to botanists than to pharmacists. Mr. Squire said that as the starch disappeared the aconitine seemed to accompany it, according to the test which he employed. This struck him as something remarkable, because the alkaloids as a whole were quite useless to the plant, or had been so considered. If a plant were watered with a solution of an alkaloid, the plant was quite unable to make any use of the compound. Certain nitrogenous compounds could be assimilated, but the alkaloids seemed to be perfectly useless in this respect. He should feel rather disposed to criticise the method of testing made use of, as not being likely to lead to very accurate results. The procedure adopted seemed to have been to test cut sections at intervals and so to test gradually the disappearance of the aconitine, but it struck him there were here two or three possible sources of error. In the first place the operator must depend on the memory as to the amount of a sensation felt some time before, which could not be done with any nicety, and then he had to depend on the nerves and tongue being exactly in the same condition in both experiments, which could not be predicated with any exactness. If the workers in the Research Laboratory could furnish a satisfactory test for aconitine and a good way of estimating it quantitatively these experiments might bear repetition, and definite information might be obtained. Mr. Squire had said that he cut off the old root at a given time and found the young root developing, and so on ; but did he find any difference in the amount of aconitine in the resulting plant, when compared with a more normal specimen? If the adult root with a great deal of aconitine yet in it had been cut off, certainly the plant could not have availed itself of that, and if no diminution of the aconitine were found when testing this plant comparatively with one not so treated, there would be a certain amount of information as to whether the plant had availed itself of the stored aconitine in the one case and not in the other.

Mr. Holmes desired to express his personal obligations to Mr. Squire for the great trouble he had taken in investigating this subject. The amount of work involved in cutting the microscopic sections, taking photographs and so on was by no means a trifle to a gentleman engaged as Mr. Squire was. As far as he could judge the best time to collect the root was from August to December, when the roots contained most starch, and, judging by the taste, most aconitine. In January, when the young leaf began to appear, before the stem was actually formed, the change began to take place. If this were the case, and as at that time there were no leaves or flowers to guide one as to the correctness of the species, it seemed that the only way to get a root of definite value was to grow the plants in this country, to pick out those which were not the true *A. Napellus* when the plants were in bloom, and later on to collect the roots which had been thus selected. If the wild plant were collected, as Mr. Greenish suggested, unless it were done at an elevation of 6000 feet

it would be almost impossible to secure the true kind. Some years ago he wrote to Professor Vogl and asked him if he would try when he took his summer holiday and get him some typical specimens, and Professor Vogl kindly sent him a collection, but only one of them answered to the type according to published works, the others being nearly all hybrids. This showed that by a careful and skilled collector it was hardly possible to get the true root in any quantity even when the plants were in flower. Mr. Squire had also shown that both in the Pharmacopœia and in Bentley and Trimen's work the description indicated that the plant had not been gathered at the time supposed, but when the stem was partly developed, and therefore some time between May and August. Such roots he had noticed were frequently hollow and comparatively worthless. In reference to some of Mr. Greenish's remarks, he might say that, under the present *régime*, the students at the school were acquainted with all the terms used in the paper, and would have no difficulty in following it. With regard to the Japanese aconite, he thought the general impression was that it was stronger than the *A. Napellus*, and he believed it had been stated to yield more aconitine in proportion than the ordinary German root. Some criticism had been made on the method of testing the root by taste, but it must be remembered that there was at present no good chemical or microscopical test for aconitine. He had had to employ taste himself, for the simple reason that there was no better test, and he found that by noticing how long the impression on the tongue lasted, a rough judgment at any rate would be arrived at as to the relative value of any two specimens. If he found that with one specimen the sensation would last an hour and a half and with another two hours, he should judge that the root which left the impression longest was the strongest of the two.

Mr. HELBING said that in Germany it was considered that the best time to collect aconite root was when the plant was in flower. In the spring and autumn there was a kind of saccharine substance contained in the root, and not so much alkaloid. The amount of alkaloid in the summer was supposed to be about half as much again as in spring or autumn.

Mr. UMNEY said Japanese aconite roots were in the market in large quantities in 1882, but since then they had almost disappeared. Within the last three or four months, however, they had again come forward, and Mr. Greenish or anyone who wished to further investigate their value could do so. It was much to be regretted that although botanists and others stated that the *A. Napellus* was the proper plant to use, a supply of them could not be obtained, and therefore they had to use German roots, which consisted of *A. Napellus*, *A. paniculatum*, and other varieties, some of which unquestionably were not so active as *A. Napellus*. He had no hesitation in saying that some of the large growers of herbs, if they had a good strain of this plant supplied to them, would undertake its cultivation as a matter of commerce. They did so with belladonna, which was largely grown in Cambridgeshire and also in the south of England, and was gathered wild in Sussex, and if anyone wanted to discover whether the cultivated or the wild plant yielded the largest proportion of atropine, he should be glad to supply plants for either source.

Mr. GERRARD said aconite preparations were amongst those in which the want of uniformity was most keenly felt. It was sometimes complained that a preparation when applied locally produced scarcely any effect, and at other times its action was intense. It would have added considerably to the value of the paper if Mr. Squire could have made some few estimations of the total quantity of alkaloid present in the roots mentioned. Had he taken the parent root at the time when the stem was removed or was dying away and also the daughter root at the same time, separated and dried them, and made an estimation of the total alkaloid—not the percentage of aconitine, because it was not certain that any one had separated the various alkaloids of aconite perfectly, but an estimate of the total alkaloids in each portion of the root—that would have been of value. Some years ago he made several estimations of the total quantity of alkaloid in the Japanese aconite as compared with the aconite of commerce, and was astonished at the very large yield; the alkaloid obtained was in a much whiter and purer condition than that which he could get precipitated from *A. Napellus* or *A. Paniculatum*. He was rather astonished to hear that as the stem and flowers developed the parent root lost its vitality and became poorer, whilst the daughter root, as judged by the taste, contained a large percentage of alkaloids. As a rule, plants in their growth developed in all directions. Taking the bellodonna as an example, as the leaf and stem developed so did the root grow, and he could say, from his own experiments, that the belladonna root contained the largest percentage of atropine when in the flowering stage. At the end of the year, especially when frost set in, changes were set up in the starchy matter, sugar was produced, and the atropine diminished. In commerce the daughter root was often found attached to the parent root, and there would be no great difficulty in estimating the relative proportions of alkaloid in these two parts.

Mr. HOLMES said the Japanese aconite root hardly ever presented the appearance of having any stem at the top, so that it was evidently collected at the time when the root was full of starch. If subsequent investigations proved Professor Green to be correct in what he had stated, then the Japanese root must be collected at the time when the starch was present, and there would, therefore, be more alkaloid in it. With regard to there being more aconitine when the plant was in flower, he thought it had been stated that the flower contained more alkaloid than the leaves, and it would seem as if the alkaloid followed the general nutrition of the plant. The fact seemed pretty clear that the roots appeared to vary in richness of alkaloid according to the amount of starch they contained.

Mr. E. RICHARDS agreed with Mr. Holmes that tasting the roots was a very good method for estimating their value. He had lately been engaged in microscopic work on this subject, and found that the alkaloid from *A. Napellus* crystallised best in some cases, but not always. Again, the alkaloid was got from a good sample of wild aconite in very much better and more defined crystal. In mounting slides it was necessary to be careful not to have a very strong alcoholic solution, or the greater portion of it would be lost. The nitrate he had not been very successful with. He had followed the directions given by Mr. John Williams at the Conference a few years ago, and quite agreed with him; but his experiments had been made with the ordinary wild roots bought from a dealer.

Mr. HOLMES asked whether all the roots were in the same condition. If one was fresh and the other dry it might considerably affect the result.

Mr. RICHARDS said they were dried specimens in each case.

Mr. SQUIRE in reply said the tongue had been objected to as not furnishing an accurate test, and, of course, if there were a definite chemical test he should have employed it; but there was such an amount of difference between the aconite roots tasted before they had grown at all at the top, and those taken later, that there was no room for mistake. For example, a slice cut from a root gathered in autumn laid while still in a moist condition on the tongue and left for a couple of seconds, would produce an effect lasting three or four hours, whilst from roots treated in the same

way in June he got practically no effect at all. At the end of June, in order to be sure of what he was about, he took one of the rootlets and chewed it for some time, and yet got scarcely any effect. He did not think the difficulty could be accounted for by the fact that the roots contained sugar; they did not taste sweet, so that there could not have been much at any rate, and in the case of the most active they could not contain any, as they were full of starch. It occurred to him once or twice that it would be an advantage if he could determine what tissues contained aconitine, but he could not see any means of doing so. Had there been a good colour test one might have applied it under the microscope, and perhaps have arrived at a result. With regard to remembering the taste from time to time, if there had been little difference in the taste at different times of the year, it would have been a difficulty, but the difference was so marked that there was no difficulty at all. He did not mean to say that in the course of a fortnight he could detect a difference, but he could distinctly say that a root examined in that way in November was a totally different thing to one examined in June when the plant was in flower. With regard to the parent root and the daughter root, his answer must be this. If he had tasted the green part of the plant, there might have been some difference, though he did not think there would be sufficient difference at that time of year between the aconitine in the stem where he had cut off the parent root and another where he had not. But with regard to Mr. Gerrard's question on this point, the time when the root was most active, as he understood, was when the daughter root did not exist. As the parent root got weaker and the daughter root got stronger, no doubt there came a time like that Mr. Gerrard alluded to, when he said he found the two attached to each other, and in many cases they were of the same size. That would tally with the description given of the remains of the stem being attached and the roots being somewhat hollow in the centre. At that time the parent root would be so far deteriorated that the daughter root growing with the same would probably contain about the same or rather more aconitine than the parent, and ultimately the daughter root would arrive at its best time when the parent root would be very much deteriorated. The parent root was richest in alkaloid when no daughter root was yet formed, and when the daughter root came to the best period there was no parent root to examine, because it had decayed away. It was rather remarkable, as Professor Green had said, that the aconitine should disappear along with the starch; and Mr. Gerrard said he was surprised to find that the aconite root got weaker when it was in flower, and quoted the belladonna as an opposite case. But it so happened that the aconite root was a very exceptional one. In most cases the root would be in an active condition at the same time as the stem; but in the aconite, when the stem was at its best and the plant generally the strongest and in flower, the root was at its worst; the parent root was going off and the daughter root had not come on to its best. His object in cutting off the parent root when the plant was growing was really to see which root sustained the plant. When the parent root was allowed to remain it gave up its starch and so helped to nourish the plant; but when this was cut off it managed almost equally well, because the daughter root grew rapidly and threw off a number of young rootlets which supported the plant. In fact, the aconite was more of a tuber than a *bonâ fide* root. There was no doubt it would be a great advantage if this subject could be worked out in the Research Laboratory or some other equally good place, and with that view he had collected last autumn about half a hundredweight of roots, carefully dried them, cut them up, and put them on one side, and intended to offer them to the Conference for some competent person to investigate. It was sometimes said that the wild aconite gave better results than the cultivated samples, but there might be some uncertainty in those cases as to what was really being operated upon. In this case he knew the plants were *A. Napellus*, that they had been collected at what he believed to be the best period, and had been carefully dried, and when the alkaloids were extracted and carefully determined, it might lead perhaps to some more definite knowledge of the subject.

The VICE-PRESIDENT, in proposing a vote of thanks, said that Mr. Squire had not by any means exhausted the subject, though he had spent a great deal of time and trouble over it. He hoped some of the students would pursue the subject, that some of these roots would find their way into the Research Laboratory, and that before long they would have some better method of determining the presence of the alkaloid than the tongue.

The next paper read was on—

THE CONGEALING POINT OF OIL OF ANISE.

BY JOHN UMNEY.

The paper is printed at page 647, and gave rise to the following discussion:—

Mr. MOSS congratulated Mr. Umney on his well-constructed and well-argued paper. Oil of anise itself had not much interest for him, but still he met with it occasionally, and when he saw that this paper was to be read, he had a few experiments made. First he looked up what had been written about it in the Pharmacopœia; afterwards he turned to see what Professor Attfield had to say, but found little, though what there was was very excellent; then he turned to the 'Pharmacographia,' knowing that anything he found there could be depended upon, and he found there pretty much the same as what appeared in the Pharmacopœia. He then looked up what was said by Professor Flückiger, in his "Pharmaceutische Chemie," and there found a good deal of information, and having done that he made a few experiments. He got oil of anise, both pimpinella and star-anise, and put it to the test the 'Pharmacographia' indicated. With respect to what was called "ordinary oil of anise," he had not seen much of it until a few days ago; for it was quite true that pimpinella oil was not the ordinary oil of commerce. He should be disposed to put the proportion much lower than was stated in the paper; he should say about 1 in 10,000. What the Pharmacopœia said about aniseed oil remaining solid was, as far as his experiments went, perfectly correct. He then tried at what temperatures the two oils congealed, and the star-anise oil appeared to congeal, if anything, a little more readily than the other, but still at a fairly high temperature, perhaps at 48° F., after starting at 63° and letting it cool down slowly. On repeating the experiment the oil did not congeal until 46°, and so going on warming and then re-cooling the oil, while keeping it perfectly still with a thermometer standing in it, he was able to reduce the temperature at which it congealed, in one case to 40°, in the other 39·5°. Having reduced them so far one began to crystallize, and he noticed the same phenomenon as Mr. Umney had, that the temperature rose rapidly and steadily, showing that the rise was due to the congelation and not to the influence of outside temperature, until it reached in one case 54° and in the other 56°. The difference of a degree or two under such circumstances did not matter, and might depend on various causes which would not be quite under control in experiments not made with great scientific accuracy. In casting about for the reason for this, he found that Professor Flückiger stated that oil of anise contained about 90 per cent. anethol, a compound which had the very peculiar property, when kept for any length

of time, of losing its power of crystallizing, so that even if cooled down to – 15° C., it still remained liquid, so that when the oil was exposed for some time it might lose the property of crystallizing. Possibly that might be explained partly by the partial conversion by the crystallizing anethol into uncrystallizing anethol. Eykmann's test as mentioned by Mr. Umney seemed to be exceedingly sharp and regular, but on obtaining Professor Flückiger's book from the library, he found the edition of 1888 made no reference to it. In a former edition it was said that star-anise and aniseed oil were so very alike that they could not be distinguished chemically. No reference was made to star-anise oil congealing at only a few degrees above freezing point, so that Professor Flückiger may have changed his mind respecting that oil since the 'Pharmacographia' was written, and before the publication of his own book. In this he made no reference whatever to the similarity of the two. All he said was that a very slight difference between them was only recognizable when they were dissolved in brandy, and then the odour became quite distinct. It appeared to him that those who had the Pharmacopœia in charge should be more in touch with those who had more commercial knowledge of these questions, and then such statements would not be met with in it as that the oil of *Pimpinella Anisum* was the ordinary oil of anise of commerce.

Mr. HOLMES also congratulated Mr. Umney on the paper, and especially on one point which Mr. Moss had not mentioned, the habit of minute observation which had enabled him to see something which a number of scientific men had not observed. The fact that there was this difference in the two oils had not been noticed by Professor Flückiger and others. In the 'Pharmacographia,' it was true it, was pointed out that the oil of fennel, after being kept some time, assumed a fluid form, but nothing was said about anethol obtained from oil of anise being the same thing. Yet it must be so, assuming the oil of anise of commerce was not diluted, because it was found that that oil did not congeal at 35°, so that it must be either the oil had been kept a considerable time or else diluted. Mr. Umney alluded casually to there not being authentic specimens of oil of anise in the Museum, and he must candidly confess the only specimen there was apparently star-anise oil. Of course it was impossible for him to obtain authentic specimens unless such were sent by those who made them. In distilling essential oils the first portion which came over was often lighter and different in properties to that which came over later—oil of cloves, for instance—and he was often not in a position to tell what portion of the oil was sent, and whether it had been bulked or not. This only showed how important it was that in preparing the Pharmacopœia some one acquainted with commerce should be on the Committee, otherwise errors would creep in.

Mr. DYMOND thought the discrepancy observed by Mr. Umney between his own results and those of previous workers, and the phenomenon alluded to by the previous speakers, might be due to the fact that volatile oils were capable of absorbing water, either in their preparation or from the atmosphere. It was well known that though at a low temperature water was, for the most part, thrown out of solution, still it had an effect on the congealing of those oils. If the congealing point of the oil were higher than that of the water, the water would tend to reduce it, whereas if the congealing point of the oil were lower than that of the water the effect would be the reverse. It was usually the case that when water was present it was merely in the form of a solution, but sometimes it was present at a lower temperature in the form of a compound, probably in the form of a sort of cryohydrate. In recently investigating an artificial oil, the real congealing point of which was below – 20° C. he found that it contained water, and it then congealed at about 5° C. He thought this matter would be worth investigating, because it might lead to the discovery of what was the cause of the very great discrepancies in congealing points of the volatile oils as found by different observers.

Mr. HOLMES said he could confirm the remarks of Mr. Dymond. He had recently some of the oil of West Indian sandal wood, which was perfectly clear when received, but after it had kept some months water separated.

Professor ATTFIELD said Mr. Umney had made clear two important points. Firstly, that whereas certain authorities he had alluded to endeavoured to prove that oil of star-anise could be distinguished from the pimpinella oil by its low congealing point, so far at all events as the oil of star-anise to be met with in the present day was concerned that was not the case. Secondly, that whereas Eykmann had told them that alcoholic hydrochloric acid was a re-agent by which oil of star-anise could be distinguished from that of aniseed by its giving no colour, that statement could no longer be depended upon, because in nearly every case he mentioned some amount of colour at all events was given. Accepting both those statements, it would seem that Mr. Umney, if he had not given a method by which one oil could be distinguished from the other, had at all events shown that the old methods could not be depended upon. Then came the extremely interesting question of how it was that this low congealing point of oil of star-anise should have been given by authorities in the past, and Mr. Umney had ventured to suggest that those who noted its congealing point were not aware that the oil might be cooled down, like most other fluids, if kept at rest, far below its congealing point. He could not quite agree with him in that. In the first place, it was scarcely to be imagined that such observers as Professor Flückiger, Hanbury, and others, could be so ignorant of the common law of heat of congelation; and, secondly, he himself could state that the oil of star of anise which he distilled many years ago did not congeal at 2° or 3° above the freezing point of water. He could also state with regard to the oil in the Museum that the congealing point of the specimen which was labelled *Illicium Anisatum* was several degrees below the freezing point of water. He had tried the experiment that day, and found if the oil were kept still it might be cooled down to 20° or 30° below freezing point without solidifying, just as with care water could be cooled down to 20° below its true freezing point. Nevertheless the oil, when it did congeal, rose in temperature, of course. Then when it was re-melted, at about 6° below freezing point it began to get soft, and at 4° below F. it was perfectly fluid. He knew nothing about that oil except from the label, but it certainly smelt of aniseed. Perhaps Mr. Umney might say it smelt more like pimpinella than illicium, which made the fact more astonishing, unless the specimen had been kept so long that it had changed from what it was to something else, though it still retained the odour of oil of anise, and had a freezing point considerably below either that of oil of ordinary anise or star-anise. Since he had heard of this matter from Mr. Umney, junr., a week or two ago, he had suggested to him that probably the explanation would be found in the relative proportions of solid anise camphor and the fluid hydrocarbon of the oil, that the one would be very soluble in the other, and according to the amount of hydrocarbon present so would the tendency of the mixture to solidify at a higher or lower temperature. He still thought that was so, and in looking up the matter, he found that the original observer, Cahours, estimated the solid constituent at four-fifths of the oil, and the liquid at one-fifth. He had no idea himself

what the proportion would be on the average, but it was quite clear from the known solubility of camphors in hydrocarbons and spirituous fluids—for instance, ordinary camphor in spirit of wine—how very soluble such stearoptenes were in elæoptenes. Further, since speaking to Mr. Umney he had written to Professor Flückiger and received a reply, in which the Professor said he knew all about the retardation of the congealing point of oil of anise, and that it was in this respect exceeded by very few oils, but it was exceeded by one or two. He said he had found that star-anise oil made nowadays did congeal at something like 50° or 60° F., but there could be no question that oils in former years congealed at a much lower temperature, and he had in his possession such oils which congealed at temperatures varying from 50° to 32° F. The very ingenious hypothesis suggested by Mr. Umney scarcely held good, therefore, as an explanation of the variously observed points of congelation for the oil of star-anise. He had nothing to say with regard to the importance of star-anise oil in pharmacy. It would seem, as far as the therapeutics of the matter were concerned, it would matter little which of these oils was used, but it would seem that the chemistry and physics of the oils were very interesting. He questioned whether the future compilers of the Pharmacopœia would very much care which oil was used or recognised, or if both were used, but it was important from a therapeutical and chemical point of view that whatever oil was used they should at least know what they were using. For the past five or ten years it had been difficult to know what any of the principal essential oils really was. He had heard so much about rectification, redistillation, and so on, that he sometimes wondered whether he had a real natural oil before him or only a product of it. Sperm oil was one thing and spermaceti another thing, and the natural oil might be a mixture of the two, and you might have varying proportions of either. So with the essential oils. With regard to the other point, he had tried Eykmann's test amongst others, and could state that one sample of oil of star-anise, which he examined some years ago, certainly gave no coloration with alcoholic hydrochloric acid, so that he had placed faith in the statement of Eykmann, who was a well known and good observer. Nevertheless, he had repeated the experiment that day, and found some star-anise oil did give a certain amount of colour. He was not disposed to place quite so much dependence on this colour test as Mr. Umney, perhaps he had not had so much experience in working with it. One rather hesitated to accept colour tests when others could be got, because it was not certain to what the colour might be due. Allusion had been made to the fact that re-distilled oil might not give the same colour with the reagent as the original oil, and if that were so the test would not avail with re-distilled oils.

Mr. Umney said there were specimens on the table of star-anise oil and pimpinella oil from Russian aniseed. The *Pimpinella Anisum* oil had been distilled in the laboratory of his firm from about 84 pounds of aniseed, whilst the specimen of *Illicium Anisatum* oil had been distilled from about 28 pounds of star-anise fruit as imported from China. He thought all would agree that it would be well for the future if the compilers of the Pharmacopœia and business men engaged in dealing in the articles described in it were in more frequent touch with each other. The Pharmacopœia stated that the ordinary oil of anise congealed at such and such temperature. The oil referred to was the oil of aniseed, but that oil was not the ordinary oil of anise at all; the star-anise oil was the everyday oil of anise. It was clear when this text was written it was supposed that ordinary oil of anise was made from aniseed, *Pimpinella Anisum*, whereas, as Mr. Moss had said, there was probably about 1 pound of that oil sold to 10,000 of the other. When the next edition of the Pharmacopœia came out he hoped either the word "ordinary" would be left out, or that it would read the "oil of ordinary anise," which had a very different meaning to "ordinary anise oil." It appeared from what Mr. Moss had said that Professor Flückiger seemed to have grown a little wiser when he brought out his last edition than he was when he conducted the experiments for Mr. Hanbury. Mr. Hanbury did not make the experiments himself; he said "the oil distilled by one of us," and the one who experimented was Professor Flückiger. In the 1867 Pharmacopœia the statement about star-anise oil and aniseed oil was right. It put the congealing points both the same. But to make this book more perfect, which was supposed to be the law, and which was appealed to if any of them were brought before the magistrates, something should be inserted giving a means of distinguishing between one oil and the other. The Pharmacopœia stated that ordinary oil congealed at a certain temperature, but it did not do anything of the sort, because star-anise was the ordinary oil of the trade, and the congealing point of that oil, notwithstanding what had been said, was not what was stated in the Pharmacopœia, but was somewhere between 50° and 58°. The colour test, in his opinion, was a very good one, but of course it must be handled very carefully. Eykmann, when he published his paper, which had appeared in the Journal, was not working on star-anise oil as compared with aniseed oil, but was trying to give tests more especially to distinguish between the oil distilled from the poisonous Japanese star-anise, the *Illicium religiosum*, and the oil that came from China, and he gave this test, which in his hands had proved fairly reliable. He acknowledged that if the oil were re-distilled and fractionized the test was not so apparent as with the natural oil. The oils on the table, which he should be pleased to leave in the Museum, were perfectly natural oils, had been distilled in a current of steam, the various distillates kept separate, and afterwards mixed together, and dried with chloride of calcium. No difference had been observed between the distillate of one period and that of another. Commercially there was sometimes great difficulty in getting oils perfectly dry, and he thought the suggestion Mr. Dymond had thrown out would well repay a chemical investigator to follow up. It was quite possible that some of these oils formed chemical compounds with water. Some oils were very troublesome in their tendency to hold water, for instance the essential oil of almonds. He would also call attention to the difference in smell between the two oils, the aniseed oil having a peculiar fatty smell which the other had not. With reference to the specimen which had been in the Museum, perhaps since he was a student, some twenty-five years ago, it might be one of those oils to which Mr. Holmes alluded, the anethol of which had lost the power of congealing altogether. The 'Pharmacographia' alluded to the anethol of fennel oil losing its power of congelation, but did not say that the anethol of anise lost its power, although chemically it ought to be identical. Lastly, he would say it was generally found that the solid and the liquid constituents of star-anise oil were not present in quite such proportions as Professor Attfield thought. The solid portion constituted at least 90 per cent. If that room had not been so warm the samples of oils shown would have appeared absolutely solid, and not even 10 per cent. of liquid would have been seen.

Mr. Holmes said as some little doubt had been thrown on the specimen in the Museum, he should like to state that to his knowledge it had been there seventeen years, at least, as it was in the Museum when he became Curator. He might remark that a specimen which had been kept a number of years was often useful

for comparison with other samples. It would be found that the odour of this oil was in accordance with what was stated on the label.

Professor ATTFIELD said the Pharmacopœia was not written by the editors, but compiled by them, and if the editors did their duty, they made use of the observations of practical men like Professor Flückiger and Mr. Umney. The 'Pharmacographia' and Pharmacopœia were not in that exact accord which had been suggested respecting the congealing point of star-anise oil, for while Professor Flückiger put the temperature at 34° or 35°, the Pharmacopœia, for a good reason, said the congealing point was a few degrees above the freezing point of water.

Mr. UMNEY observed that the Pharmacopœia referred to the Fahrenheit scale and Professor Flückiger to the centigrade, and a few degrees centigrade could not be a few degrees Fahrenheit. He quite agreed with what Professor Attfield had said as to the duties of the compilers of the Pharmacopœia. They all looked through that work to find errors, but after all these were very few and far between. Professor Attfield and those who consulted him in preparing that book had to depend upon the researches of others, for it was absolutely impossible that they could work out all these matters themselves. It was the duty of pharmacists when they found anything was not right to mention it at such meetings, and show where the error lay, so that their friends, if any of their actions were called in question, might have some means of showing that there was a difference of opinion, and that the statements of the Pharmacopœia and actual practice did not always quite accord, and that at an early date such errors might be rectified. This had been done in more instances than one, to the general benefit, and he hoped a similar result would follow the reading of this paper.

Mr. JOHN UMNEY, in reply, said Professor Attfield had referred to a letter from Professor Flückiger, stating that he was now aware that the congealing point of star-anise oil was about 50°, and that formerly when he examined a specimen it was 25°. It was rather a pity that at the present day the congealing point was still put forward as that which was determined as long ago as when the 'Pharmacographia' was published. It could not be said that 50° was a few degrees above the freezing point of water. Professor Flückiger also said that he was aware re-distilled oil did not give such a striking reaction with alcoholic hydrochloric acid, but it gave an indication which was perfectly unmistakable. The pimpinella oil gave a manganese pink, whilst the illicium oil gave a tint varying from yellow to brown, so that there could be no chance of mistaking them. The proportion of solid to liquid was quite as great as 90 to 10 parts.

The VICE-PRESIDENT then proposed a vote of thanks to Mr. John C. Umney for his admirable paper. He had felt very much interested in it, not only as affording information, but also as indicating a line of research which students would do well to follow. The vote was carried unanimously.

The next paper read was a—

NOTE ON CASCARA SAGRADA.

BY JOHN MOSS, F.I.C., F.C.S.

The paper is printed at p. 649, and gave rise to the following discussion:—

Mr. SQUIRE said he could confirm what had been said as to the rise of price in cascara bark. Curiously enough he had also received samples of the Oregon bark and the "out of season" bark from the same house as Mr. Moss had mentioned. He had intended to cut sections and bring them before the Society, but his time had been so occupied that he had not been able to do so.

Mr. HOLMES said when Mr. Moss first submitted the specimens to him, he could only judge of them from their external appearance, but since then he had had microscopic sections cut and mounted, and they were now on the table. He saw no difference between the genuine bark of *Rhamnus Purshianus* and the so-called false specimen, except that one section contained a few more crystals than the other. The structure seemed absolutely identical, and Mr. Hart, of Manchester, who had cut the sections and who was an experienced microscopist, agreed with him that there was no material difference. This being the case, he imagined that the so-called false bark was nothing of the kind, but was simply collected at the wrong time, when it did not peel readily, this having been done on account of the unusual demand. With regard to the difference in colour of the inner surface, he might mention that barks varied in colour according to the way in which they were dried. He had specimens in the Museum of nux vomica bark, some of which were of a pale brown colour on the inner surface, whilst others were quite black. In the same way, with cascara, some were pale and some dark brown. Colour could not be depended on, except in a transverse section, and even then it would vary with the age; there was a specimen of cascara sagrada in the Museum five or six years old of a deeper yellow tone in transverse section than any he could procure at present. As to the specimen from Oregon being another species, he might mention that the *Rhamnus Purshianus* extended through Oregon to British Columbia; but another species, also collected for similar purposes, the *Rhamnus Californica*, did not extend through Oregon. The only other species which did so was the dwarf *R. alnifolia*, which, according to Mr. Steel, of California, was never collected for medicinal purposes, being much too small to repay collection, the full grown plant being only 2–4 feet in height. There was every reason to suppose that the Oregon cascara was simply *R. Purshianus*.

Mr. MOSS in reply said he was pleased to find that his remarks had met with general acceptance. His idea was that this so-called spurious cascara was really genuine, and only differed in certain characters from what they were accustomed to see, simply from difference in the time and circumstances of collection. With regard to the difference in colour of the inner surface he had spoken entirely from his own observation, and was quite prepared to defer to Mr. Holmes's greater experience. The Oregon cascara did not appear to have any of the characteristics of being collected out of season; his idea was that it was *R. Purshianus* grown in a different region. The odour when confined in a bottle, and the action, of which he could speak positively, were very similar, and therefore he thought it might be put down as from the same species.

The VICE-PRESIDENT then moved a vote of thanks to Mr. Moss, which was carried unanimously.

Donations to the Museum.

The specimens exhibited included crystals of oubain and strophanthin, lent by Mr. Thos. Christy, F.L.S.; a new gum from Brazil, presented by Messrs. Symes and Hallawell, and which, as compared with a specimen of Mogador gum from the same firm, was shown to yield a solid mucilage with twice its own weight of water, while the latter with its own weight of water afforded only a syrupy mucilage; a specimen of Palembang benzoin, presented by Mr. J. Humphrey; the so-called "massoi bark" side by side with the genuine massoi bark from New Guinea, and the citronelle fruits (*Tetranthera citrata*), presented by Messrs Schimmel and Co.; false cubebs, from New York, and the supposed false cascara sagrada bark, from Mr. J. Hartford. The beautiful crimson colour given by the genuine cubebs with oil of vitriol was shown, together with the yellowish brown tint produced by the false cubebs. Sections

of the true and supposed false cascara sagrada bark were shown under microscope. These had been cut for the occasion by Mr. J. Hart, F.C.S., of Manchester. At the conclusion of the meeting authentic specimens of the volatile oils of *Illicium anisatum*, and *Pimpinella Anisum* were presented to the Museum of the Society by Mr. Umney.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday, the 6th instant, at No. 11, Harcourt Street, Dublin, at three o'clock, the Vice-President of the Society, Mr. H. C. Draper, in the chair.

The other members of the Council present were Messrs. Baxter, Begg, Merrin, McCormack, Hodgson (Treasurer), Grindley, Wells, Simpson and Dr. Tichborne.

The minutes of the last meeting having been read,

Mr. Baxter begged to be allowed to express his thanks to the Vice-President and also to Professor Tichborne and Mr. Merrin for the honour which had been done him in electing him a member of that Council. He fully appreciated the honour, and esteemed it to be such. In taking his seat for the first time at their board he thought it only right to say that any love for chemistry and chemical research that he had he in a great measure attributed to the College lectures of one who had taken a high rank amongst scientific men, and who also possessed the ability of inspiring the students under his care with interest in and enthusiasm for the study in which they were engaged. He need scarcely say that he referred to their esteemed ex-President, Professor Tichborne, who, he was happy to see, was a member of the board. He (Mr. Baxter) would act to the best of his ability in assisting to perform the important work with which the Council was charged.

The Vice-President: We all have much pleasure in welcoming you amongst us, and we hope that you may sit a great many years at the board, and be not only as useful a member as you yourself think, but as we believe you are capable of being.

A letter was read from Messrs. Clay and Close, Parliamentary Solicitors, stating that their charges in connection with the promotion of the Irish Pharmacy Act, 1875, Amendment Bill of 1888, amounted to seventy guineas, the amount of work that had to be done having been considerably more than was at first contemplated.

Mr. Hodgson said he heard the amount claimed with a considerable amount of surprise, for he candidly confessed that he expected it to have been considerably more extensive. He had had some experience of Parliamentary Bills, and he knew the enormous expense that attended every movement connected with the promotion of a Bill in Parliament. He considered this account very small indeed, having regard to the amount of work done. It was to a certain extent unsatisfactory that all that labour had been, to a certain extent, thrown away. However, that was not the fault of Messrs. Clay and Close, who did all in their power to bring the Bill to a satisfactory termination, so far as the Society was concerned. He had therefore great pleasure in moving that their very moderate account should be discharged.

Professor Tichborne said he had much pleasure in seconding the motion.

The Vice-President: Do you think it requires a motion at all? But, if it be made, should we not add a rider to it expressing the thanks of the Council to them for the way in which they performed their work?

Mr. Wells: I think we should.

Mr. Hodgson: I think that the remarks that have been already made involve that.

Professor Tichborne suggested that Mr. Ferrall should lay on the table at the next meeting of the Council a statement of the total cost of the Bill.

Mr. Hodgson said he was not aware that there was anything outstanding; but he presumed what Professor Tichborne wanted was, not only the amount of Messrs. Clay and Close's bill, but also the amount of travelling expenses, the cost of printing and every other item of expense.

The Vice-President: You should give a notice of motion about it.

Mr. Hodgson said there was not the slightest objection to the return being laid on the table.

Mr. Baxter's letter thanking the Council for having elected him a member was read.

A letter was read from Dr. Collins, lately a member of the Council, returning thanks for the kind resolution which had been passed about him.

A letter was also read from Dr. Montgomery thanking the Council for the kind resolution passed on the occasion of the acceptance of his resignation, and saying that he should always remember with pleasure his connection with the Council and the courteous manner in which any suggestion that he made had been received.

The Vice-President: We all regret the unhappy circumstances that brought about the retirement of these gentlemen, but unfortunately the matter must now rest as it is.

The following letter from the Committee of Management of the Conjoint Examinations of the Royal College of Surgeons and the Apothecaries' Hall of Ireland was read:—"To the Secretary of the Council of the Pharmaceutical Society of Ireland. Sir,—I am directed by the Committee to acknowledge receipt of your communication of December 21, 1888, enclosing letter addressed to your Council by Mr. Hill in reference to the rule which requires candidates for first examination to submit evidence of three months' study of pharmacy, certified by a general hospital, a school of pharmacy or a licentiate apothecary. With reference to Mr. Hill's communication the Committee felt that its tone and language would have justified them in declining to consider it, and that as the writer was in full possession of the terms of the rule for many months previous to the date of his presenting himself for examination, and did not take the steps necessary to comply with it, he had no just cause of complaint, nor any claim to the consideration with which he was treated. The Committee therefore sees no sufficient reason for departing from their previous decision on Mr. Hill's case. As to the general question of the propriety of the rule, the Committee desire me to say that it is not competent for them to vary any part of the scheme of examination and education without the approval of the Royal College of Surgeons, and of the Apothecaries' Hall, but they have submitted the correspondence to each of these bodies with a view to a full consideration of the points raised thereon. Your Council will be informed in due course of the result of that consideration. I am Sir, yours very truly, A. B. Jacob, F.R.C.S.I., Secretary to the Committee of Management."

The Vice-President: This letter touches a very important point, but I presume the matter must be in abeyance for the present. No step can be taken until we hear again from the Secretary of the Committee of Management of the Conjoint Examinations.

Mr. Hodgson: We cannot take any step at present; but evidently Dr. Jacob has submitted the points involved to both the College of Surgeons and the Apothecaries' Hall.

The Vice-President: The only comment I would make on the letter is, that it did not strike me that there was any want of deference in Mr. Hill's communi-

cation; but his case does not affect the general question, and Dr. Jacob you see has separated the one from the other.

A letter was read from Messrs. Casey and Clay announcing that in the case of the Pharmaceutical Society *v.* Fee, the Queen's Bench Division of the High Court of Justice in Ireland had unanimously decided that the decision of the magistrates was wrong in every point, and had remitted the matter back to the magistrates, with instructions to inflict a penalty on the defendant.

Mr. Wells: Have we to go back to prosecute him again?

Mr. Ferrall said that Mr. Saunders, a gentleman from Messrs. Casey and Clay's office, would go down before the magistrates about the case.

A donation was received from the Pharmaceutical Society of Great Britain of the Calendar for 1889.

The next business was the following notice of motion, which stood in the name of Professor Tichborne:—

"That it is the opinion of the Council that no important part of the proceedings of the Society shall be omitted from the official reports, except by an order of the Council which has been carried by a majority of the Council."

Professor Tichborne said he had received a communication from the President, who had been obliged to go to London, asking him to postpone this motion. Of course he would do so, as he preferred that the President should be present when he moved it.

The Vice-President announced that the reports of the results of the last Preliminary and License examinations were on the table. There were 6 candidates for the Licence, of whom 2 were rejected, and 11 for the Preliminary examination, of whom 4 were rejected.

Professor Tichborne: What did the rejected candidates in the Preliminary examination chiefly fail in?

Mr. Hodgson: Weights and measures appear to have been a weak point with some of them.

Professor Tichborne said he found there were also failures in Latin.

The Vice-President stated that a Committee, consisting of Mr. William Allen and himself, had been appointed to inspect the chemical laboratory of the City of Dublin Technical Schools. Last month he made a verbal report, but it was incomplete, because they had not been able to get from the Registrar of the Schools all the requisite information. He had since supplied it in a letter, in which the intention and promise of the Committee to give the number of hours for the study of practical chemistry required by the Society, and to register the attendance of students, was conveyed. It had been noticed by Mr. Allen and himself that there were no arrangements for the practice of volumetric analysis; but he believed that this defect was to be supplied under new regulations. The report of the Committee being now complete, they had only to add that whatever might be thought of the Technical Schools by the students themselves, they had only to recommend the schools as fit and proper to be accepted by the Council.

Mr. Grindley said the Committee of the schools had met the Council very fairly.

Mr. Hodgson: I think we may very fairly accept the Technical Schools.

The Vice-President said he was quite surprised at the amount of good work that appeared to be done in them.

On the motion of Mr. Hodgson, seconded by Mr. Grindley, it was ordered that the Chemical School connected with the City of Dublin Technical Schools be recognized by the Society.

The following were elected members of the Society: Mr. Michael Francis O'Donnell, of 192, Phipsborough Road, Dublin, proposed by the President, and seconded by Mr. Hodgson, Treasurer; and Mr. James Noy Vance, of Main Street, Bray, Dublin, proposed Mr. Wells and seconded by Mr. Grindley.

Some other business having been disposed of the Council adjourned.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The annual meeting of the fortieth session was held at the Royal Institution on Thursday evening, January 31. The President. Mr. A. H. Samuel, F.C.S., in the chair.

The minutes of the previous meeting having been read and confirmed and some donations announced, Messrs. William Burgess and J. Newton were unanimously elected members of the Association.

The President then called upon the Honorary Secretary, Mr. J. S. Ward, to read the annual report, which was followed by the Honorary Treasurer's statement for the year presented by Mr. R. M. Sumner, and shewing a balance in hand of £16 16*s.* 11*d.*

Annual Report.

During the session nine ordinary meetings have been held, and some very valuable papers read, notably one on "The Origin of Petroleum," by the President, and one on "Tabellæ and Pastils," by Mr. Harold Wyatt, Jun. In addition we have been favoured with some important miscellaneous communications, and we have also had discussions upon "The Pharmacy Acts Amendment Bill," and upon the "Advisability of Adopting Regulations for the Keeping, Selling, and Dispensing of Poisons;" in connection with the latter, a petition was forwarded to the Lords of the Privy Council, asking them to confirm a resolution formed by the Council of the Pharmaceutical Society of Great Britain, declaring "That Carbolic Acid ought to be deemed a Poison within the meaning of the Pharmacy Act, 1868." It may fairly be said, therefore, that the work of the past session (the first under the new *régime*) is well worthy of the reputation of the Association.

Your Council have much pleasure in stating that the amalgamation of the late Liverpool Registered Chemists' Trade Association with this Association has proved very advantageous, strengthening it numerically and extending its sphere of usefulness by bringing it into closer communion with the chemists and druggists of the city generally.

Your Council have much pleasure in announcing that the 7th edition of the Liverpool Chemists' Price List is very nearly sold out, and they have appointed a Committee, consisting of Messrs. T. F. Abraham, J. Bain and J. R. Day, to revise the List with a view to the publication of a new edition. This Committee will be glad to receive any suggestion from members of the Trade.

Messrs. A. H. Samuel, Dr. Symes, M. Conroy, W. Wellings, and J. Bain were appointed Delegates to the British Pharmaceutical Conference, held at Bath, and Messrs. Symes, Conroy, Wellings, and Bain attended.

The President and the two Hon. Secretaries were appointed Delegates to the Associated Soiree of the Learned Societies.

A very enjoyable Meeting of the Members and friends was held at the Stork Hotel, on the evening of March 15, when over 70 gentlemen dined together, under the chairmanship of Mr. A. H. Samuel, F.C.S. (President). The after dinner proceedings were enlivened with choice selections of vocal and instrumental music, and readings. The unanimous opinion of those present was that this means of promoting social intercourse

among the Members of the Association ought to be encouraged, and that the Dinner should be continued from year to year.

The Hon. Treasurer will present his Annual Statement showing a balance in hand of £16 16*s.* 11*d.*

Your Council regret having to record the death of Mr. W. T. Warhurst, and also that of Mr. Richard Evans, both of whom were highly respected Members of this Association.

During the Session 22 new Members have joined the Association, and 5 have resigned, or have been struck off, leaving the numerical strength at the present time 124.

Your Council have much pleasure in announcing the re-election of Mr. A. H. Samuel, F.C.S., as President for the ensuing Session.

Messrs. A. C. Abraham, F. J. Mackinlay, R. Parkinson, J. J. Smith, A. Stewart, R. M. Sumner, and T. Williams retire from the Council by lot, but are eligible for re-election, with the exception of Mr. A. Stewart, who desires to retire.

It was moved by the President, seconded by Mr. J. Bain, and unanimously resolved that the report as read be adopted; and together with an abstract of the proceedings and a list of the members be printed and circulated amongst the members.

Dr. Symes, in supporting the motion for adopting the report, said he regretted it did not occur to them earlier to include a paragraph on the School. They used to report on the School, and he might say that on a recent visit he was much pleased to find such good educational arrangements and so many students earnestly at work.

The election of seven members of Council to fill the vacancies of those who retired by lot now took place, Messrs. Day and Hocken being appointed Scrutineers. The following were elected:—Messrs. A. C. Abraham, F. J. Mackinlay, R. Parkinson, J. J. Smith, W. R. Smith, R. M. Sumner and T. Williams, Mr. W. R. Smith taking the place of Mr. A. Stewart, of Birkenhead, who did not seek re-election.

During the counting of the votes it was proposed by Mr. F. J. Mackinlay, seconded by Mr. T. F. Abraham, and unanimously resolved, "That the best thanks of the meeting be given to the donors to the library and museum and to the authors of papers during the past session."

It was also proposed by Mr. A. W. Barratt, seconded by M. H. B. Thornton, "That a vote of thanks be accorded to the officers and Council for their services during the past session."

Mr. J. S. Ward now moved, "That the words 'every alternate Thursday' in law 8 be omitted and the word 'monthly' be substituted." In putting his motion Mr. Ward said he could perhaps best show cause for the change by saying a few words on the history of the Association. He said it would be familiar to many of those present that the Association had undergone a considerable change in its composition during the last few years. Formerly it numbered amongst its members many gentlemen who were connected with technical chemistry and other allied sciences, gentlemen who were able and even anxious to communicate papers, with the result that there was never any difficulty in getting a supply of really good papers for the meetings. But now the Association was composed almost entirely of chemists and druggists, and papers were not so readily obtained, and he contended that seven or eight really good meetings during the session would reflect greater credit on the Association than double the number with a comparative lack of papers and small attendance.

In seconding the motion, Dr. Symes said he scarcely need add anything to Mr. Ward's cogent remarks, which he thoroughly endorsed. Seven or eight ordinary meetings during the session would enable them to deal with the matter at their disposal, and if it should so happen that they had an extra paper they could hold an extra meeting.

Mr. A. C. Abraham would like to move as an amendment that it read "every alternate Thursday or monthly," as he considered it desirable that the Council should be able to call meetings oftener than monthly if they were thought necessary, which, he held, could not be done in compliance with the laws if Mr. Ward's resolution were carried.

Messrs. T. F. Abraham, F. J. Mackinlay, Hocken, Thornton and others expressed themselves to the same effect.

The President ruled that no amendment of which notice had not been given could be considered, and that Mr. Ward's motion must either be passed or rejected as it stood.

After some further discussion the motion was put to the meeting and negatived.

ROYAL SOCIETY OF EDINBURGH.

The fifth ordinary meeting of the present session took place on Monday evening, February 4, when the first paper read was:—

Strophanthus Hispidus: Its Natural History, Chemistry, and Pharmacology,

BY PROFESSOR T. R. FRASER, M.D., F.R.S.

Only the first of these divisions of the subject was dealt with on this occasion. After referring to the subject of arrow poisons in general, the author related how the first specimens of *Strophanthus* reached Edinburgh, a few ripe follicles having been sent to Sir Robert Christison early in 1869 by the Rev. Horace Waller, with the information that the seeds contained in the follicles constituted the Kombé poison of Eastern tropical Africa. Sir John Kirk (then Consul at Zanzibar) had previously discovered that the Kombé poison was prepared from these seeds. Professor Fraser described the manner in which he had examined a number of poisoned arrows received from different parts of Africa, as also a few old specimens from museum collections. The poison adhering to the arrows was submitted to microscopic, chemical, and physiological examination, and in the great majority of cases was found to be *Strophanthus*. It is remarkable that these arrows were derived from districts so widely separate as the river Gambia, lake Tanganyika, and the Zambesi river, showing that the use of the Kombé poison is widely disseminated in the African continent, being employed both in warfare and in the chase.

The genus *Strophanthus* was first described by De Candolle in 1802, the name being given to it on account of the twisted thong-like prolongations of the lobes of the corolla (*Strophos*, a twisted band or cord). It is a genus of the family Apocynaceæ, and is fully described by Bentham and Hooker. About twenty species are at present known, De Candolle himself having described four. *Strophanthus Kombé*, described by Oliver, and formerly regarded as a distinct species, is now to be classed as merely a variety. After an examination of more complete specimens of the flowers and leaves, particularly of flowers sent home from Africa by Mr. J. Buchanan, Professor Oliver is of opinion that they are *Strophanthus hispidus*, the variation not being greater than one would expect in a species of such wide distribution. Importance is therefore to be attached to the species *hispidus*, as it has, in all probability, furnished the materials for the chemical and pharmacological investigations that have hitherto been made, as well as for the therapeutic experience that has been collected within the last twenty years. The species is not known to occur elsewhere than in Africa, but it is widely distributed over that

continent in its tropical or sub-tropical regions. The plant is described by Buchanan as a strong climber, lying in folds on the ground, and climbing to the tops of neighbouring trees. The fruit is arranged in pairs, which have the appearance of gigantic thorns. Professor Fraser then proceeded to give a lengthy description of the characters of the different parts of the plant, but the account does not lend itself to brief abstraction. The skill of Mr. Lindsay, Curator of the Edinburgh Botanical Gardens, in growing *Strophanthus* plants from the seeds was acknowledged, one of the specimens having attained a height of 10 feet.

In the discussion which followed the reading of the paper, Dr. Felkin remarked that he was probably the only one present who had seen the Kombé arrows in actual use. He had treated many of the natives of central Africa who had been wounded by these arrows. In all cases in which the native antidote had been administered within five minutes of the wound being received, that patient recovered. The nature of this antidote is unknown.

Professor Fraser's paper received great attention, and much interest was shown in the arrows and specimens of the plant which were exhibited.

At the same meeting a very interesting communication was made by Mr. John Aitken on "Apparatus for Counting the Dust Particles in the Atmosphere." This apparatus has been constructed according to the principles enunciated by Mr. Aitken in former papers. It was found that when the moisture is condensed in a rarefied atmosphere, each raindrop has a dust particle for its nucleus, so that by sweeping a measured portion of the air into an exhausted receiver, by means of pure air, and counting the number of deposited drops, it is easy to calculate the number of dust particles in a given volume of the impure air. The counting is managed by having the silver plate in the receiver divided into millimetre squares, so that it is only necessary to count the drops on one square millimetre. Mr. Aitken showed that the air of the hall (which is well ventilated) contained 400,000 particles in the cubic centimetre, while a specimen of air taken near the roof of the hall gave 3,500,000 in the cubic centimetre. In Edinburgh on a fine day after snow the number of dust particles in the c.c. was 75,000, but in pure country air the number is often as low as 5000.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The sixth meeting of the eleventh session was held in the Pharmaceutical Society's House, 36, York Place, on the evening of Wednesday, February 6, at 9·15. Mr. George Coull, President, in the chair.

The minutes of last meeting having been read and approved the Chairman called on Mr. Mackenzie to read the following paper:—

Analysis of 1000 Prescriptions of Forty Years Ago.

BY W. G. MACKENZIE.

Just twelve months ago Mr. D. McEwan contributed an interesting analysis of 1000 contemporary prescriptions to a meeting of this Association. Having access to an old prescription book containing a fairly typical representation of Edinburgh prescriptions of a bygone generation, it occurred to me that an analysis of these would be interesting for comparison with the results obtained by Mr. McEwan. For this purpose I selected 1000 from a period forty years ago. I have followed mainly, though not strictly, the arrangement adopted by Mr. McEwan, so that any who may be sufficiently interested can compare the two analyses by referring to his paper published in the *Pharmaceutical Journal* of February 18, 1888.

I found that 85·6 per cent. of the forms were for internal, and 14·4 per cent. for external use; Mr. McEwan found 82·2 and 17·8 per cent. respectively.

Of internal medicaments the various forms occurred in the following proportions:—mixtures, 367; pills, 272; powders, 151; drops, 36; powders in bulk, 21; electuaries, 5; suppositories, 2; pessaries and injection, 1 each.

Forms for external use occurred as follows:—liniments, 48; ointments, 34; lotions, 33; gargles, 11; powders in bulk, 7; mouth washes, 3; ear drops, 2. There being no uniform standard authority at the time I refer to I could not classify the various preparations into official and non-official, and I have dealt with the galenical (and some chemical) preparations alphabetically. The salts of 15 metals were used as follows:—*Potassium*: 10 salts used 113 times: bicarbonate, 62; iodide, 19; nitrate, 16; chlorate, 5; sulphate, 3; acetate, bitartrate, and sodio-tartrate, 2 each; chloride, 1. Bromide was entirely absent and did not occur till 1853, and then only 4 times in doses of from 3 to 5 grains. *Sodium*: 3 salts 47 times: bicarbonate, 41; biborate, 4, chloride, 2. *Ammonium*, carbonate 5 times. *Bismuth*, subnitrate 55 times. *Zinc*: 6 salts 28 times: sulphate 17, oxide 5, valerianate 3, carbonate, chloride and acetate, 1 each. *Iron*: 6 salts 107 times: sulphate 33, saccharated carbonate 24, red oxide, 6, ammonio-muriate 1, quinine citrate 29, ammonio-citrate 14. *Mercury*: metal and 3 salts 93 times: metal as blue pill 50, as grey powder, 21, subchloride, 17, perchloride 3, protoiodide 2. *Alum* 1. *Antimony*, potassio-tartrate 8. *Copper* sulphate 2, ammoniated 1. *Lead* acetate 11, iodide 1. *Lime*, carbonate 8. *Magnesia*: calcined 21, carbonate 9, sulphate 22.

Alkaloids occurred as follows:—quinine sulphate, 58, beberine sulphate, 8, morphine hydrochlorate, 7, strychnine 2.

Taking the galenicals in alphabetical order they occurred as follows:—*Acetum* cantharidis 1, acetum scillæ 8. 8 *diluted acids* were used 91 times, sulphuric 30, nitric 21, hydrocyanic 17 acetic 9, aromatic sulphuric 8, hydrochloric 4, nitromuriatic and phosphoric 1 each. The relative positions of sulphuric and nitromuriatic acids are nearly the reverse of those found by Mr. McEwan. *Aquæ*: 7 were used 109 times; cassiæ 35, camphoræ 22, cinnamomi 20, menthæ piperitæ 15, rosæ 10, aurantii floris 6, anethi 1. Aqua cassiæ seems to have been the favourite, and might with advantage have been retained in the B.P. It is cheaper than cinnamon and makes a pleasant mixture. Peppermint water was ordered as aq. menthæ on 7 of the 15 times stated. I have not the slightest doubt that aq. menth. pip. was dispensed on each occasion. *Confectio* piperis and confectio sennæ 1 each. *Decoctions*: 10 used 18 times: aloes co. 4, cinchona 3, pruni virginianæ, senegæ and uvæ ursi, 2 each; chirettæ, dulcamaræ, hæmatoxyli, hordei and quercus, 1 each. Decoctions are evidently disappearing, as Mr. MacEwan only found them prescribed twice. *Emplastrum*, belladonnæ 3, picis and resinæ 1 each. The absence of emplastrum cantharidis surprised me, as I had always regarded it as one of the most common resources of the older practitioners. *Extracts* 18, including fluid extracts of rhubarb and senna, 4 each. The remaining 16 solid extracts were used 269 times: hyoscyamus 72, aloes socotrinæ 44, gentian 41, taraxacum 22, rhubarb 27, colocynth co. 18, belladonna and nux vomica 10 each, anthemidis 7, conium 6, aconite 4, opium 3, hops 2, and liquorice, lettuce and lobelia, 1 each. These figures contrast very strikingly with those given by Mr. MacEwan, in whose list nux vomica leads with 17 appearances. Pills appear to have been much more popular forty years ago than now. I found 27·2 per cent. of the 1000 prescriptions were in pilular form, while Mr. McEwan found only 12·4. A perusal of some of the

pill forms filled me with a high respect for the dispensing abilities of our pharmaceutical forefathers. Pill-making, I fear, is becoming a lost art. I may safely assert that in not more than 1 in 150 cases do you now get a really tough thing to tackle, whereas I could give half a dozen prescriptions for pills out of almost the same number of pages that would test even qualified dispensers pretty thoroughly. I may here mention that I met with Battley's preparations of cinchona, opium and taraxacum nine times in all, and the only other proprietary articles met with were Bow's liniment and Henry's magnesia 1 each and James' s powder 9. *Infusions*: 22 were used 81 times: gentian 21, rose 10, quassia 9, cascarilla 6, prunus virg. and valerian 5 each; chiretta and simaruba 3 each; the others were calumba, chamomile, cinchona, digitalis, dulcamara, hops, matico, orange, pareira brava, rhubarb, senega, senna, serpentary and taraxacum. The comparatively limited use of quassia, calumba and serpentary is noteworthy. *Liniments*: 6 were used 42 times: opium 16, camphor co. 10, soap 8, camphor 6, and calcis and Bow's 1 each. A B C liniments appear to have superseded opium liniment nowadays as a sedative application. *Liquors*: 9 were used 117 times: morphinæ hydrochlor. 42, ammoniæ acetatis 29, potassæ 19, calcis 5, arsenicalis 4, also ammoniæ, ferri pernit. and plumbi. *Misturæ*, cretæ 7, amygd. amar. 2. *Mucilagines*, acaciæ 29, tragacanth 1. *Pilulæ*: 12 kinds were used 136 times: hydrargyri 50, rhei co. 24, colocy. co. 20, aloes et ferri 9, aloes et myrrh. and galbani co. 7 each; aloetic 6, colocyn. et hyoscyam. 5, aloes et assafœtid, 3, also digitalis et scillæ, ferri carb. and scillæ. *Pulveres*: 10 were used 65 times: cinnam. co. 29, and ipecac. co. 14, stand at the top and retain the same position to-day. *Spiritus*: 8 were used 88 times: ætheris nitrosi 42 and ammoniæ aromat. 33, are at the top. Sp. chloroformi was unknown at this date. *Succus*: limonis 2 is the only representative of its class. The vegetable succi introduced by Squire in 1835 do not appear to have found favour in these northern regions till many years afterwards. *Syrupi*: 11 were used 163 times: aurantii 34, scillæ and zingiberis 28 each. Syrup of iodide of iron was the only chemical mineral syrup met with; a contrast to the style now so much in vogue. *Tincturæ*: 42 were used 276 times: hyoscyamine 33, card co. 32, opii 20, cantharidis 18, gentian co. 17, opii camph. 15, lavand. co. 14, aconiti 13, digitalis 6, nucis vomicæ 2, etc. The increased use of nux vomica and digitalis, and the decrease in the use of hyoscyamus at the present day is noteworthy.

Ointments: 12 were used 37 times: citrine 16, simple 6, cetacei and plumbi acet. 3 each, picis 2, camphor, mercurial, red precipitate, zinc oxide, etc., 1 each. The limited use of zinc ointment is noteworthy. *Wines*: 6 were used 57 times: ipecacuanha 28, antimonial 15, colchicum 9, and iron, opium, and aloes. The first retains its popularity, but the remainder seem to be going out of favour.

Fixed and essential oils: 14 were used 50 times: croton 13, turpentine 9, peppermint 6, carraway 5, cloves 3, almond and olive 2 each, etc.

I conclude with a list of drugs, pure and simple, including a few odds and ends.

Drugs in powder: rhubarb 100 (probably the extensive use of eclectic remedies at the present day may account for the marked decrease in the use of rhubarb, blue pill, *et hoc genus omne*, as shown by Mr. McEwan's figures), opium 26, calumba 28, ipecacuan 25, socrotine aloes 24, barbadoes aloes 22, ginger 12, guaiacum 11, scammony 10, squill 8, nux vomica 7, etc.

Iodine 4, sulphur 6, aloin 3, jalapin 1, salicin 3 (in doses of ½ to 2 grains in pills), chloroform 3 (only as a solvent for camphor); camphor 13, tannin and gallic acid 8 each; glycerine only occurs once, and is spelt "glycyrrhina." The six medicines I found most frequently prescribed were—

Rhubarb, in powder	100
Ext. Hyoscyami	72
Potassii Bicarbonas	62
Quininæ Sulphas	58
Bismuth. Subnit.	55
Blue Pills	50

From this it will be seen that only one of the six most frequently occurring in contemporary prescriptions, as found by Mr. McEwan, is also found in my list, namely, bismuth subnitrate, which he found 48 times. It is also noteworthy that one of the six he found most frequently, namely, potassium bromide, does not occur once in the 1000 prescriptions. Although this salt was known at the time I speak of, its modern uses had not been discovered. In materia medica books it was classed as a special stimulant, possessing properties similar to potassium iodide. It is little more than twenty years since it began to come into use as a remedy in hysterical epilepsy and as a general sedative and soporific in nervous disorders. Perhaps its extensive use in such cases accounts for the striking decrease in the use of hyoscyamus. Another metal found by Mr. McEwan, but absent from my list, is cerium. I found it first occurring in 1853, about which time it was introduced by Sir J. Y. Simpson. Lithium is also absent from my list. It was first used by Dr. Garrod in 1857.

Many curious thoughts are suggested by a perusal of these prescriptions of a bygone generation and a comparison of the remedies then in use with those of to-day. The great increase in the number of chemical syrups and the very extensive use of phosphate and hypophosphite syrups is very striking. One cannot help noticing, too, the extreme nastiness of many of the compounds of that time compared with the attractive elegance and pleasantness of most of our present day remedies. It almost seems as if the chief virtue of a remedy was frequently its repulsive nastiness, and one cannot wonder at the common belief that all medicines ought to have a disagreeable and nauseating taste.

Other noticeable features are the increase in the number of organic chemicals used, and in the number of proprietary preparations. In the latter respect the change is enormous. As to whether this is a sign of progress there may be room for difference of opinion. In the course of my survey I came across several very peculiar and interesting formulæ, some of which may perhaps form material for a short communication to some future meeting. I have to express my thanks to Mr. John Robertson, Circus Place, for a perusal of his prescription book.

The next communication, read by Mr. Hill, was—

A London Letter.

BY PETER MACEWAN, F.C.S.

The writer first gave a word of advice to assistants coming to London. He briefly described metropolitan life in pharmacy, and the chances of success as compared with provincial opportunities, concluding that the former, being the larger field, was perhaps the best for smart men. He considered, however, that in Edinburgh there were pleasures and privileges open to young pharmacists which were not so easily obtainable in London, and, therefore, that assistants should take full advantage of these while they had the opportunity. All should have the Minor qualification before seeking a situation in London, and they should come well supplied with testimonials and references. A few hints were added as to the best way of obtaining a situation, the writer being of opinion that the applicant should be on the spot. In the second part of the paper—"How to apply for a Situation"—sketch letters of application were given. He stated that many assistants in writing for a situation make a mistake by not giving full information regarding them-

selves. He considered that everyone should be explicit by giving particulars of their business experience and qualification, and of any other matters which are likely to be considered by an employer in search of an assistant. The third part of the paper dealt with the work and workers of the Association. The writer stated that the papers contributed during recent sessions showed great advancement, especially in the direction of originality. He urged that the young members should continue to report to the Association on the quality of commercial supplies, believing that by good training in the examination of ordinary chemicals and chemical or galenical preparations the worker learns to have respect for accurate manipulation, he gains confidence in himself, and is able to attack more difficult matters as he becomes experienced. Such work is also directly on the lines of practice for the higher examination, and to encourage it he suggested that the Association should appoint a small research committee to select subjects, to get suitable men to take up these subjects, and to aid them by advice as to the method of investigation, and, if necessary, in drafting reports.

The discussion on the papers was taken part in by Messrs. Bowie, Coull, Henry, Hill, Lunan, McCurrie, McEwan, Macpherson and Merson, and on the motion of the Chairman cordial votes of thanks were awarded to the authors.

A report from the Prize Committee, suggesting an alteration in the Assistants' Competition, having been read and approved, the meeting was closed.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The first public lecture in connection with the above Society was given by Dr. Sorby, LL.D., F.R.S., on Wednesday, February 6, in Whiteley's College before a large audience. The subject was "The Microscopical Structure of Iron and Steel," and was fully illustrated by means of a lantern, managed by Mr. Forsdike. The President, Mr. Radley Learoyd, occupied the chair.

Dr. Sorby said he commenced the study of his subject many years ago, and for several years made investigations, though at that time few people appeared to be interested in the question. Latterly he was glad to notice it was being admitted on all sides that the future knowledge of iron and steel would be due, to a very large extent, to the application of the microscope, and he described the special methods of illumination required when applying the microscope. The structure of the various kinds of malleable iron was detailed, and special attention was given to the peculiarities caused by the introduction of carbon in the manufacture of steel. Various kinds of steel were then spoken of, and the changes were described that take place when annealing and hardening that metal. An account was next given of the remarkable characteristics of various kinds of cast iron, and the lecturer said the structure showed that certain properties of cast iron differed very much from cast steel. It was also shown why the difference between Bessemer steel and wrought iron made the former superior for certain purposes. In the future study of iron and steel it would be extremely important to properly co-relate the chemical composition, mechanical properties, microscopical structure of those metals. This would require years of research, but when properly done most important facts would probably become known.

Votes of thanks to Dr. Sorby for his lecture, and to Mr. Forsdike for managing the lantern, concluded a highly successful meeting.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of this Association was held at 103, Great Russell Street, on Thursday, January 31, Mr. J. Millard, President, in the chair.

The minutes of the previous meeting having been read and confirmed, and a new member proposed, the President called on Mr. H. C. Everson to read a paper on "Photographic Printing and Development."

The paper will be printed in an early number.

ROYAL INSTITUTION.

The Life History of a Marine Food-Fish.

A lecture was delivered on Friday, February 1, by Professor W. C. McIntosh, on the life history of the principal edible sea fishes. It is only within the last few years that the subject has been properly understood, very erroneous ideas respecting it having prevailed up to a recent date. For instance, it was thought that sea fishes sought shallow water in the spawning season in order to deposit their eggs on the bottom, but there is no reason whatever to lead to the supposition, the probability being that the eggs are ejected wherever the fish happens to be. The life history and development of fresh water fishes, such as the salmon, have been pretty accurately known for some time, owing to the greater facilities for observing them, but the observation of marine fishes has presented greater difficulties, necessitating the employment of more expensive methods. The lecturer explained and illustrated the methods employed, and apparatus used for capturing the eggs and young fish. Nets with very fine mesh are employed, and are chiefly of three kinds, one for use near the surface, another for sinking to a considerable depth, and a third for attaching to the beam of a trawl to catch those at the bottom. Unlike those of the fresh water fish, the eggs of the majority of marine fishes are not deposited on the bottom, but float freely about in the ocean wherever the currents carry them, and are therefore called "pelagic." The cat-fish forms an exception, its eggs being deposited in masses at the bottom. The "pelagic" eggs are small, transparent, glassy spheres, which can scarcely be seen when floating in the water; their specific gravity is almost the same as that of sea water, so that they float about at various depths beneath the surface and are carried up or down by the slightest current. Many of them have a globule of oil in them which has been supposed to have something to do with their floating, but this is probably not the case. The number produced by a single fish is enormous, being about nine millions in the case of the cod. Their vitality is very great and withstands a considerable amount of heat, eggs which had been heated to a considerable temperature in a test-tube having afterwards unexpectedly shown signs of life and motion; they are more readily killed by cold. The egg gradually develops into the embryo fish, which at first has no mouth, but lives on nutriment derived from the yolk-sac of the egg, which remains as a large lump on the under surface of the anterior part. In the embryos of most mammals and fresh water fish the nutriment is absorbed from the yolk-sac by bloodvessels sent down into it; but in the cod and other marine fishes, although the heart is present and beating in the embryo, no bloodvessels are sent down into the yolk-sac, and the nutriment is probably absorbed directly by the tissues. After about ten days the mouth opens and the yolk-sac gradually disappears. At first the embryo is transparent and passive, allowing itself to be carried about like the egg, but it soon begins to develop patches of pigment and fins, although these

are very different from those found in the mature fish. The colour and form of most sea fishes vary very much at different stages of growth, and in many cases they could not be recognised as the same fish; the young ling for instance, besides being very different in colour from the adult, has two very long pectoral fins, which caused it at first to be taken for a new kind of fork-beard. These differences in the young and adult stages are probably to be attributed, as in mammals, to the survival in the young of ancestral peculiarities, which have become modified in the adult to suit different circumstances. These differences are very remarkable in the flat fishes such as turbot, flounder, etc., where the young fish is nearly round and has the eyes symmetrically placed on each side of the head; at this stage it does not lie on the bottom but swims freely in the upper water. As it gets older the fish seeks the bottom and exhibits a tendency to lie constantly on one side, and one eye works round from the lower side to join the other on the upper. The eye may pass round over the top of the head, or in some cases it may pass through the soft tissues; in the young stage the body is so transparent that the fish can probably look obliquely through its own body and see what is passing on the other side. At the same time that the eye passes round, the under side loses its colour and becomes white, the upper side remaining pigmented. It sometimes happens, however, that from some unknown cause, a young flat fish does not go to the bottom but remains swimming in the upper waters, and then both sides remain coloured and symmetrical. The food of the young post-larval fish consists of minute crustaceans, etc., which are present in large quantity in the ocean, and nearer land, at the mouths of estuaries, etc., the spawn of mussels and similar molluscs which feed on microscopic plants, affords a plentiful supply. At a later stage they are very voracious, and many specimens were shown of fishes which had attempted to swallow others nearly as big as, or even bigger than, themselves, with fatal results. The general tendency among marine fish is to sink down towards the bottom as they get older, the younger ones keeping nearer the surface; near land, the younger ones seems to find their way towards the shore, but migrate outwards again as they get older. The lecturer touched on the point of providing a close time for sea fishes during the spawning season, and thought that although it might easily be done in the case of any special fish, it was scarcely feasible to make it general, as the spawning period varied so much among different species as to stretch it over a great part of the year for the whole. He did not think that the ravages of man made a very great impression on the numbers of fish, but urged the importance and utility of studying their lives and habits. A good deal had been done in the last few years, and he hoped that the Government, which had been so generous in sending out the *Challenger* expedition, would also help in this direction.

Parliamentary and Law Proceedings.

THE SALE OF VERMIN KILLER.—WHAT IS A SUFFICIENT KNOWLEDGE OF THE PURCHASER.

An inquest was held on Friday evening, the 8th inst., before Mr. F. Price, County Coroner, at Salford, on the body of Mary Ellen Kerwick, cloth-cap maker, 18 years of age. From the evidence given, it appeared that on the previous day the girl had been found at her lodging apparently in agony. She said she had taken some mouse poison to kill herself, as she did not want to bring disgrace on anyone or to have people speaking ill of her. A doctor was sent for, but the girl died in a short time.

Dr. Percy Stocks, house surgeon at the Salford Royal Hospital, gave evidence to the effect that he had made a *post mortem* examination of deceased, that he found she was pregnant, and that she had died from strychnine poisoning.

Thomas Jackson, pharmaceutical chemist, of 43, Great Ducie Street, Strangeways, Manchester, deposed that he sold deceased a 6d. packet of Battle's Vermin Killer on Wednesday morning, the girl signing her name in a book kept for the purpose. He knew the girl by sight, but did not know her name. He cautioned her as to the use of the poison.

The Coroner said that in his opinion to know a person by sight was not a sufficient justification for a chemist entrusting that person with a virulent poison. To carry out the law on the matter the chemist should be acquainted with the name and address of the applicant for a poison, and should have some good grounds for believing that the article wanted was to be used for a proper purpose.

The jury returned a verdict of suicide under temporary insanity, and unanimously agreed to a presentment to the effect that Mr. Jackson was censurable for having supplied the deceased with the poison with which she took her life, and that the police authorities be requested to take proceedings against him if they be advised that he has infringed the law.

Correspondence.

COCA LEAVES.

Sir,—Permit me to say a few words in reply to Mr. Christy's letter.

In the first place, your appreciative remarks (*antea*, p. 575) were based not on my short paper before the Linnean Society, but on an article which appeared in the *Kew Bulletin* for January, 1889.

My paper before the Linnean Society, which dealt purely with the "botanical characteristics" of certain plants included under *Erythroxylon Coca* of Lamarck, is not yet published; and until it is I must decline to accept the grotesque interpretation given of it by Mr. Christy.

I would further ask your readers to believe that I did nothing so foolish as to base either the botanical or chemical characters on the mere size of any coca leaf. I placed no great value on the "Java variety"—whatever that may mean; and I certainly made no statement to the effect "that one of the most valuable varieties of coca plants known at the present time is that coming from the U. S. Columbia." D. MORRIS.

EXTRACT OF NUX VOMICA.

Sir,—I am reported in last week's issue as having said during the discussion on Mr. Duncan's note on extract of nux vomica, that I "would rather favour a standardized fluid extract."

As this is not what I wished to convey, please allow me space to briefly state what I desired to say, as presumably I have imperfectly expressed myself.

I intended to say that exactitude could be got and maintained by the addition to the present extract of a small quantity of a hygroscopic substance like glycerine, rather than risk subjecting the alkaloids to a prolonged dessicating process, sure to injure the finished product therapeutically, were the dry extract to be adopted.

Edinburgh. GEORGE LUNAN

Iodine.—We believe the preparation referred to is the subject of a patent and particulars will therefore probably be found.

J. H.—See a paper on the "Composition of the Air of Sewers and Drains" in the *Pharmaceutical Journal* [3], vol. iv., p. 287.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Ellborne, Machen, Cripps, Stark, Wilkinson, Cowley.

THE QUALITY OF QUININE SULPHATE.

BY B. H. PAUL, PH.D., AND A. J. COWNLEY.

The abnormally low value of cinchona bark, and consequently of quinine, during the past three or four years, might be regarded as reducing very considerably the probability of impurity in the quinine salts of commerce; but at the same time it must be remembered that this depreciation in value has been accompanied by a fierce competition between different quinine manufacturers, which might have an opposite effect. In order to obtain some data in reference to the quality of the quinine salts met with in the market, a number of analyses have therefore been made from time to time, when opportunity offered for obtaining well authenticated samples, and as the results thus obtained show that there are still very great differences in the degree of purity of these preparations, it may be useful to call attention to the fact as illustrating the necessity for testing every fresh supply purchased.

The method of testing adopted was the recrystallization test introduced by one of us some ten years since, and admitted to be one of the two best methods applicable for the purpose. The samples examined represent all the different makers of quinine sulphate, and in all instances these samples were procured under conditions that did not admit of doubt as to their authenticity. From the following tabular statement of the results it will be evident that excluding some few exceptional instances the samples examined were on the average fairly pure when judged according to the standard of the British Pharmacopœia. Even in regard to

	Water of crystallization.	Quinine Sulphate.	Cinchonidine sulphate.
1 . .	8·61	91·39	—
2 . .	16·00	79·68	4·32
3 . .	15·30	80·93	3·77
4 . .	15·66	84·34	—
5 . .	14·03	85·57	0·40
6 . .	14·21	76·72	9·07
7 . .	14·35	75·80	9·85
8 . .	13·67	81·00	5·33
9 . .	10·73	87·69	1·58
10* . .	14·44	85·56	—
11 . .	13·87	81·73	4·40
12 . .	15·30	81·34	3·36
13 . .	14·66	77·70	7·64
14 . .	15·35	77·35	7·30
15 . .	12·70	74·96	12·34
16 . .	15·83	75·87	8·30
17 . .	15·23	78·69	6·08
18 . .	14·92	79·28	5·80
19 . .	13·16	81·04	5·80
20 . .	15·07	73·33	11·60
21 . .	12·54	83·96	3·50
22 . .	15·13	75·60	9·27
23 . .	15·50	79·30	5·20

those which contained from 7 to 8 per cent. of cinchonidine sulphate, it might perhaps be contended that they should be accepted as not containing "much more than 5 per cent. of sulphates of other cinchona alkaloids." But though opinions might differ as to this question, it is certain that no less than fourteen out of the twenty-three samples examined were of a nature to satisfy official requirements in respect of purity, since the amount of cinchonidine sulphate was in all instances less than 6 per cent. Some of these samples were indeed absolutely free from cinchonidine, and that fact was probably due to the sulphate having been manufactured from cuprea bark, which is well known to be characterized by the absence of cinchonidine. In one instance that was ascertained to have been the case by the detection of a trace of cupreine in the sulphate. But in addition to these there were nine samples in which the amount of cinchonidine sulphate ranged from 6·08 to 12·34 per cent., and there can be no doubt that most of these samples might reasonably be held to exceed the limits of impurity allowed by the standard of the British Pharmacopœia. By selling quinine sulphate of this character the vendors would become liable to penalties under the Sale of Food and Drugs Act, and hence it will be evident that the suggested necessity of testing this article is by no means superfluous for those who care to protect themselves against such a contingency.

As regards the method of testing, it may be useful to mention that the recrystallization test as given in the British Pharmacopœia would lead to very fallacious results, and if the directions there given be followed very impure quinine sulphate might be passed as satisfactory. In carrying out this test it is important that the solution of the quinine sulphate under examination should be made without any addition of acid. The only effect of adding acid, as directed in the British Pharmacopœia, is to obscure the indications subsequently obtained in regard to the presence of cinchonidine. It is equally important to remember that no satisfactory result can be obtained by operating upon a recrystallization mother liquor measuring five or six ounces for 100 grains of quinine sulphate operated upon. Both these conditions would lead to failure, because they are antagonistic to the principle of the test, which is to concentrate the cinchonidine salt in the mother liquor, by virtue of its comparatively greater solubility, and at the same time to minimize the quantity of quinine salt associated with it by reducing the mother liquor to a small volume. It is therefore always necessary to evaporate the mother liquor obtained by recrystallizing the quinine sulphate, and when operating upon 100 grains of the salt it would be more appropriate to concentrate the mother liquor to the volume of about one fluid drachm and separate the crystals deposited before testing with ether and ammonia.

It may be well to remark that some of the tests prescribed by makers of quinine sulphate are not to be relied upon as affording indications of the purity of this salt. This is especially the case with those tests in which ether and ammonia are applied to the salt direct. By testing in this way it is always possible to overlook considerable amounts of impurity, and even with the greatest care to avoid the errors peculiar to this method the results obtained are doubtful. Moreover in the published tests above referred to the proportion of ether directed to be used is much too large to admit of the presence of cinchonidine being ascertained.

Analytical Laboratory,
13, *Fenchurch Avenue.*

* This sample contained a trace of cupreine.

A NEW ADULTERATION OF SAFFRON.

BY E. M. HOLMES, F.L.S.

Curator of the Museum of the Pharmaceutical Society of Great Britain.

When, in the year 1444, Jobst Findeker was burnt together with his adulterated saffron,* much ruder forms of adulteration were probably employed than those in vogue at the present day.

It is only as knowledge increases and more skill is displayed in adulterating costly drugs, that detection becomes difficult. Not many weeks ago the adulteration of saffron with about 70 per cent. of marigold florets tinged with red sanders wood, and skilfully rolled into the likeness of saffron, was pointed out. The adulteration of saffron with various heavy mineral powders during recent years has also evinced a skill worthy of a better object, the appearance of such saffron to the unaided eye and its odour being unexceptionable.

But these comparatively clever adulterations are easily detected by immersing the saffron in water, when the marigold florets unroll and show their distinctive shape, and the mineral powders fall to the bottom of the vessel.

During the last two months, however, a distinct advance in roguery has been made, and a much less easily detected form of adulteration has been adopted.

In the *Journal de Pharmacie et de Chimie* (February, p. 98), M. Adrian has called attention to the adulteration of a sample of saffron with various *soluble* salts. His specimen was sold as Spanish saffron, and was guaranteed to be pure. On analysis it was found to contain 26·4 per cent. of ash as against 7·145 from a sample of genuine saffron.† This ash was found to consist chiefly of borate, chloride and sulphate of sodium and carbonate of potassium. M. Adrian believes that the carbonate of potassium was present in the saffron in the form of neutral tartrate, and that nitrate of ammonium was also present in it. The exact analysis, however, is a matter of scientific rather than commercial interest, and at the present moment I am chiefly concerned to warn pharmaceutists against a very insidious form of adulteration of saffron, and to point out the means whereby it may readily be detected.

This is the more important, since during the last fortnight saffron similarly adulterated with soluble salts, but of excellent colour and odour, has been offered in the London market at about 6*s.* per lb. below the ordinary market value. A complete analysis has not as yet been made of this saffron, but the following tests will render the falsification easy of detection.

(1) When placed in water it *immediately* gives out an orange-yellow colour; true saffron under the same circumstances giving out a lemon-yellow tint more slowly.

(2) When heated in a platinum crucible, as soon as it takes fire it deflagrates like touch paper, indicating the presence of a nitrate.

(3) The ash in the crucible quickly fuses, whereas in the case of saffron the ash retains the form of the saffron filaments.

(4) The presence of a nitrate in the infusion can be confirmed by the sulphate of iron and sulphuric acid test.

This saffron was found to contain 15·13 per cent. of moisture, being above the average (12 per cent.).

The adulterated saffron met with by M. Adrian differs in certain respects. It is distinctly hygrometric, augmenting in weight in an atmosphere relatively dry, and its aqueous infusion is alkaline. He mentions also that when rubbed between the fingers into a ball it retains that form, not being elastic like true saffron.

The adulterated saffron met with in London does not give an alkaline infusion, and remains crisp in a moderately damp atmosphere, and when rolled into a ball between the fingers unrolls more slowly than genuine saffron. A few particles of crystalline matter, apparently some insoluble or sparingly soluble salt, can be observed to fall to the bottom of the test glass when it is placed in water. The adulterations in the two cases are therefore different, although both present a new feature in the use of soluble salts to increase the weight of the drug instead of the more clumsy additions previously employed.

PERCOLATION.

BY JOSEPH INCE.

The general directions in the British Pharmacopœia are as follows:—Macerate for forty-eight hours in three quarters of the spirit, in a closed vessel, agitating occasionally; then transfer to a percolator, and when the fluid ceases to pass continue the percolation with the remainder of the spirit.

There are certain forms of percolating apparatus commonly used in pharmacy, and others specially designed either to effect continuous percolation or to accelerate the process. Three prevailing types are familiar to every pharmacist. First those in which access or exclusion of atmospheric air is regulated by grooves; secondly, those in which access or exclusion is regulated by a central tube; thirdly, those in which the flow of percolate is regulated by an inferior india-rubber tube, which can be raised or depressed as circumstances may require.

After these come a variety of shapes which are adaptations of the same modes of construction. In the three typical forms of percolator the process may be controlled at will; percolation may be made to proceed rapidly, at a moderate rate, or to cease altogether.

It seems hard, therefore, to accept the official direction that a given substance should be macerated in one vessel and then transferred to another.

Emeritus Professor Redwood has himself contrived an excellent apparatus called the automatic percolator, which serves at once for a macerator, percolator, pressing-bag and containing vessel. It is most useful and but too little known. It is not, however, any particular form of percolator which ensures success; that depends on the skill and management of the operator. Every description of percolator which I have seen can with average intelligence be converted into a macerating apparatus, while the more usual shapes are contrived for the express purpose.

The method of previous maceration in a closed vessel and subsequent transference has the threefold disadvantage of being—

1. Unnecessary; 2. Wasteful; 3. Messy.

It is suggested that official sanction should not be extended to a method which the practical pharmacist soon learns to disregard.

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* 'Pharmacographia,' 2nd ed., p. 666.

† 'Pharmacographia,' p. 667, gives 5 to 6 per cent. as the proportion of ash afforded by genuine saffron.

THE ALKALOIDS OF THE ARECA NUT AND THE PHYSIOLOGICAL ACTION OF ARECOLINE.

The "areca nut" or "betel-nut," the seed of the areca palm (*Areca Catechu*), originally indigenous in the Sunda Islands, but now cultivated extensively in the warmer parts of India as well as in the Philippines, has become there an important commercial article. In the east, as is known, it is used as a masticatory together with lime and leaves of the betel pepper, and according to von Bibra the betel chewers number 100,000,000. The areca nut is also occasionally used in China and India as a vermifuge, and successful results in this respect have procured its introduction into the materia medica of European countries, it being sometimes used in Germany, for instance, as a remedy against tapeworm.

Up to the present it has not been known to which of the constituents the areca nut owes its extensive use among the Malays as an article of food, or upon which constituent its action as a vermifuge depends. The nut contains about 15 per cent. of tannin substance, 14 per cent. of fat colouring matter, etc.,* and, in addition, according to Bombelon,† it contains a liquid volatile alkaloid, the properties and composition of which, however, he had not described. As it seemed probable that the physiologically active constituent was to be looked for in this alkaloid, Herr Jahns was induced to investigate the subject more closely, and has reported the results recently to the Berlin Chemical Society.‡

In the preparation of the areca bases two methods were adopted, which gave equally good results. According to one the powdered seeds were exhausted three times with cold water, to which strong sulphuric acid had been added in the proportion of two grams to each kilogram of the seeds; the pressed and filtered extracts were evaporated to about the weight of the raw material used, and after cooling and again filtering precipitated with potassium-bismuth iodide and sulphuric acid. An excess of the precipitant had to be avoided, since it exercises a solvent action on the separated double salt. The red crystalline precipitate was after some days filtered out, washed and decomposed by boiling with barium carbonate and water; the alkaloids went completely into solution, whilst bismuth oxyiodide, colouring matter, etc., remained undissolved. After filtration the alkaloidal solution was evaporated to a small volume, treated with sufficient caustic baryta, and shaken repeatedly with ether, which removed a base that has been named "arecoline," on account of its oil-like character. The residual liquid, which beside alkaloidal hydriodides, contained some barium iodide, was neutralized with sulphuric acid, and the alkaloids were set free by treatment successively with silver sulphate, caustic baryta and carbonic acid. The solution of the pure alkaloids was evaporated to dryness and the residue exhausted with cold absolute alcohol (or chloroform). "Arecaine" remained undissolved, whilst a third alkaloid, together with colouring matter, etc., went into solution, and upon evaporation of the alcohol remained as an amorphous mass.

According to the second method the powdered areca nuts were exhausted cold with milk of lime, the filtered extracts neutralized with sulphuric acid and evaporated to a syrupy consistence. By dissolving in a little water and filtering the gypsum and separated colouring matter were removed; the solution was then again concentrated, made alkaline, and the arecoline shaken out with ether. The other bases were then precipitated as before with potassium-bismuth iodide and sulphuric acid.

The yield of arecoline amounted to 0·07—or at most 0·1—per cent.; that of arecaine to 0·1 per cent. Only a very small quantity of the third alkaloid was obtained.

Arecoline ($C_8H_{13}NO_2$).—The arecoline was withdrawn from the ether solution obtained as described by shaking it with acidulated water, the neutralized liquid evaporated to a small volume and after adding sufficient potash solution again shaken out with ether. The base left upon evaporation of this solution was neutralized with hydrobromic acid, and the dried salt perfectly purified by repeated recrystallization from absolute alcohol. From this purified compound the free base and other salts of it were prepared.

Arecoline forms a colourless oily liquid of strongly alkaline reaction, which is soluble in all proportions in water, alcohol, ether and chloroform. It is volatile and can be distilled, the boiling point appearing to be about 220° C., though this could not be determined with certainty, on account of insufficiency of material. The salts are easily soluble, some of them deliquescent, but mostly crystallizable. It gives with potassium-bismuth iodide a pomegranate red precipitate, consisting of microscopic crystals (a delicate reaction), and with phosphomolybdic acid a white precipitate. Potassium-mercury iodide throws down from solutions not too dilute yellow oily drops, which after several days solidify and crystallize; solution of iodine throws down brown drops, and picric acid, a resinous precipitate that afterwards crystallizes in needles. Gold chloride also throws down oily drops, which, however, do not solidify. Platinic chloride, mercuric chloride, and tannic acid give no precipitate.

Arecoline hydrobromide ($C_8H_{13}NO_2 \cdot HBr$) crystallizes best of the simple salts. It is readily soluble in water, and in hot—but less freely in cold—alcohol; from an alcoholic solution it crystallizes in fine anhydrous prisms. The salt is permanent in air, not hygroscopic, and melts at 167° to 168° C.

Arecoline hydrochlorate crystallizes from a syrupy solution in fine needles, which deliquesce upon exposure to air. It is freely soluble in alcohol, as well as in ether-alcohol. It behaves similarly to the sulphate, acetate, and nitrate.

Arecoline platinochloride ($(C_8H_{13}NO_2,HCl)_2 \cdot PtCl_4$) is precipitated in glutinous flocks upon the addition of ether to mixed alcoholic solutions of arecoline hydrochloride and platinic chloride. After being washed with ether-alcohol and dissolved in water, it crystallizes from this solution upon standing over sulphuric acid in handsome well-formed rhombic orange-red anhydrous crystals, melting with frothing at 176° C. With cadmium chloride arecoline hydrochloride appears to form several crystalline double salts, readily soluble in water and difficultly soluble in alcohol.

Without doubt, arecoline is the physiologically active constituent of the areca nut, and the one upon which its action against tapeworm is dependent. It appears in this respect, as well as in its composition and properties, to stand near to pelletierine, one of the alkaloids of pomegranate root bark, which is also liquid and volatile, and has a composition, according to Tanret, corresponding to the formula $C_8H_{15}NO$.

Arecaine ($C_7H_{11}NO_2 \cdot H_2O$), purified by repeated crystallizations from 60 per cent. alcohol, forms colourless crystals, permanent in the air, freely soluble in water and in dilute alcohol, less soluble in stronger and nearly insoluble in absolute alcohol, by which it is dehydrated. It is also insoluble in ether, chloroform and benzol. The aqueous solution is neutral in reaction and has a slightly perceptible weak saline taste. At 100° C. arecaine loses its water of crystallization, melts with frothing at 213° C., and carbonizes when more strongly heated. In a solution acidulated with sulphuric acid potassium-bismuth iodide produces an amorphous red precipitate that

* 'Pharmacographia,' 2nd. edit., p. 670.
† *Pharm. Journ.*, [3], xvi., 838.
‡ *Berichte*, xxi., 3404.

very quickly becomes crystalline. Potassium-mercury iodide is far less delicate; it does not precipitate the (neutral) solution of the free alkaloid, but if this be acidified the double salt separates in yellow needles, or at first as an oily precipitate that quickly crystallizes. Potassium iodide also fails to affect a neutral solution, but upon acid being added dark-coloured needles separate. Phosphomolybdic acid, as well as tannic acid, give a slight turbidity; picric acid gives no precipitate, and gold chloride and platinic chloride precipitate crystalline double salts from solutions that are not too dilute.

Arecaine combines with acids to form crystalline salts, having an acid reaction, freely soluble in water and less soluble in alcohol.

In respect to its properties arecaine comes near to trigonelline (methylnicotinic acid), from fænugreek, and probably resembles it in being a betaine-like body. Further experiments in this direction could not, however, be carried out for want of material. Like betaine, arecaine has proved inert in experiments upon animals.

The third areca alkaloid mentioned could not be closely examined, since the small quantity at disposal was not sufficient for the preparation of the pure compound. It was amorphous, easily soluble in water, alcohol and chloroform, difficultly soluble in ether, and had a strongly alkaline reaction. The platinum double salt crystallized in flat prisms or tables.

Physiological Action of Arecoline.

The investigation of the physiological action of arecoline has been carried out by Dr. Maumé of Göttingen,* who used for this purpose the hydrobromide and the hydrochloride, of which subcutaneous or intravenous injections were made, or sometimes the solution was applied to the conjunction of the eye. It was found that full-grown rabbits died within a few minutes after the subcutaneous injection of 25 to 50 milligrams, but recovered after 10 milligrams. Cats succumbed after administration similarly of 10 to 20 milligrams, only the course of the poisoning was somewhat more prolonged. Dogs, even small animals of five to six kilograms body-weight, although strongly poisoned by the subcutaneous injection of 50 to 75 milligrams were not always killed.

The symptoms of poisoning which were observed corresponded in many respects with those seen by Schmiedeberg in his investigation of muscarine, and further, when lethal doses were not used, they could be neutralized by means of atropine sulphate; eventually however they presented characteristic differences. The most dangerous action of arecoline consists in the slowing of the heart's action by small doses, or even its stoppage, just as takes place with muscarine; but the latter works in smaller doses, and it is only after somewhat larger doses of arecoline that the ventricle of the frog stops in diastole or is so influenced that the ventricle is not emptied and only after long intervals makes a weak undulatory muscular contraction. Subsequent injection of atropine removes this action upon the heart. Simultaneously with the heart's action the respiration is also affected. Small doses cause a considerable increase in the number of inspirations; larger doses cause a slower action with intensified expiration; and very large doses rapidly stop the breathing, especially in cats. After intravenous injection of a lethal dose the respiration usually ceases before the action of the heart.

The subcutaneous injection of 50 to 70 milligrams of arecoline salt into dogs of four to five kilograms body weight, besides strong irritation of the heart, gives rise to tetanic cramps, which quickly give place to a partial paralysis. As a rule, however, the animals overcome the effects of such doses, the heart resuming its action completely as the effects pass off, but it becomes again affected through vomiting and liquid evacuations in which sometimes also worms are brought away. An increased peristaltic action of the bowels is, however, provoked in rabbits, dogs and cats, by much smaller doses.

Intense poisoning of dogs, rabbits and cats with arecoline may also be accompanied with so strong a contraction of the pupils of both eyes, that in dogs and rabbits they do not show larger than the head of a good-sized pin, whilst in cats they are reduced to a mere streak. Instillation of arecoline solution in an eye gives rise also to a strong one-sided narrowing of the pupil, but the quantity required is so large that the production of myosis in one eye may induce a flow of saliva in rabbits, and affect the heart and respiration in cats. For this reason the action of arecoline upon the human iris has not yet been tested.

Arecoline separates unaltered with the secretions and excretions, from which it can be recovered. In the absence of a characteristic colour reaction, arecoline separated from urine can only be identified chemically by its behaviour with potassium-bismuth iodide, and physiologically by its action upon the heart of a curarized frog.

It has been stated by various authorities that the chewing of the areca nut gives rise sometimes to poisonous symptoms. As the natives of India and the neighbouring islands chew principally the juicy kernels of the younger areca nuts with some quicklime and a leaf of *Piper Betel*, or older nuts that have been submitted to a preliminary treatment with hot water, it can be understood that these morsels contain little of the easily soluble arecoline, and that therefore it is only seldom that poisonous symptoms are observed, and then as a rule not in natives. But it is also in accord with observations made during the experiments on animals that the organism may become gradually tolerant to the poison of areca nut, as in the case of the smoking and chewing of tobacco.

In the opinion of Dr. Maumé the physiologica experiments indicate that the areca nut may prove a valuable article of the materia medica, since there can be no doubt that arecoline hydrobromide is capable of being utilized therapeutically on account of its effect on the peristaltic action of the bowels, and on entozoa, and also in suitable combination as a cardiac remedy.

* *Pharmaceutische Zeitung*, February 9, p. 97.

THE REACTIONS OF SOME PHENOLS WITH CHLOROFORM AND ALKALIES.*

BY DR. G. A. RAUPENSTRAUCH.

Many of the different sensitive and elegant tests for phenols are lessened in value by the fact that they have been thoroughly applied to only one single phenol, leaving it uncertain whether other phenols, or analogous compounds, might not deport themselves similarly. Among these reactions is to be found that one which is based on the mutual action of phenols, alkali and chloroform.

It is only lately that Schwarz (*Pharm. Zeit.*, 1888, No. 56) proposed to prove the presence of chloral and chloroform in liquids by the action of resorcin upon the aqueous solution of chloral or chloroform in the presence of solution of soda, when, according to the relative amount of the reagents, a red coloration or a yellowish-green fluorescence appears. This reaction, which recently has also been recommended by Leon Crismer (*Pharm. Zeit.*, 1888, No. 88), was first proposed for the detection of phenols by Gareschi (*Berichte*,

* Translated from the Berlin *Pharmaceutische Zeitung*. Reprinted from the *Druggists' Circular*.

1872, p. 1055), though it is very seldom mentioned even in the larger books of reference. As Gareschi surmised, and as Reimer and Tiemann were able to verify, this reaction is based on the fact that rosolic acid is formed on moistening alkaline phenates with warm chloroform; and by the red coloration produced, even traces of phenol can be recognized.

Lustgarten proposed later, the behaviour of resorcin and naphthol to chloroform and iodoform, in the presence of alkali, as a mutual test for these substances (*Monatsh. f. Chemie.*, 1882, p. 715), and Stoermer has proposed the same reaction as characteristic for thymol (*Pharm. Zeit.*, 1886, p. 744).

It follows, then, that the reaction mentioned cannot without reserve be applied to the identification of carbolic acid, resorcin or thymol. Since some other phenols and analogous substances also deport themselves similarly with chloroform or iodoform in the presence of alkalies, I will give, in addition to the foregoing communication, the results of a series of experiments which I have been induced by Dr. Schmitt to prosecute. In making these experiments I started from the supposition that this sensitive and beautiful reaction might serve for the recognition of phenols in general, and perhaps for distinguishing some of these, by making use of some first peculiarities of the reaction. The supposition was confirmed by experiments with the pharmaceutically and hygienically important phenols; and it was also found that the reaction gave valuable hints for the identification of particular phenols and analogous substances.

In order to be able to compare the deportment of the several phenols, I carried out the reaction by dissolving the phenol in question in chloroform, and heating the solution in a test tube with a fragment of caustic potassa, to boiling. After a shorter or longer boiling of the chloroform the corresponding coloration is generally developed in a very beautiful manner, said coloration being one of several shades, from the pale red of carbolic acid, through purple and violet to the blue of beta-phenol. The boiling point of the chloroform generally indicates the best temperature at which the test is to be made.

For the identification of a phenol in food, contents of the stomach, urine, etc., it is recommended to shake the substances, or the distillate, with chloroform. To the separated chloroformic solution of the phenol is added a fragment of caustic potassa, and it is heated to boiling, all of which serves to make the reaction easy of production.

Potassa gives a more beautiful colour than soda, although the difference is very slight. The reaction is in general also obtained by employing the carbonates of alkalies and alkaline earths.

In order to determine the delicacy of the reaction, 2 c.c. of several chloroformic solutions of varying strength were boiled in test tubes with a fragment of potassa. The reaction takes place also in the cold, but the coloration appears very gradually, and often it is not the chloroform which is coloured but the small pieces of potassa; and if the solution is heated to boiling, and allowed to stand, the change of colour can be observed for quite a time. Reducing and oxidizing substances generally hinder the reaction; the addition of alcohol will in many cases suddenly increase the intensity of coloration, but sometimes prevent the reaction altogether; ether prevents it still more easily. Since the reaction does not succeed very well with diluted aqueous solutions, it is best to shake them with chloroform; the relative solubility of the phenol in water and in chloroform will, of course, influence the delicacy of the reaction. In a few cases it will be found best to shake with ether, allow the separated ether to evaporate at a gentle heat, and take up the residue with chloroform. In the following experiments the chloroformic solution of the phenol was 1 to 1000, and the dilution was carried on as long as a reaction could be observed. The several substances were first purified after well-known methods, and were as follows:—carbolic acid, ortho-cresol, meta-cresol, thymol, guaiacol, resorcin, hydrochinon, pyrogallic acid, beta-naphthol, salol and betol.

Carbolic acid.—A pale red coloration appears, which on boiling or by standing, gradually turns to brown, till the liquid finally turns light yellow or colourless. The following phenols give similar changes of colour. The red coloration is still to be noticed in a dilution of 1 to 60,000 parts of chloroform; addition of water causes very soon a decolorization.

o-Cresol gives a lilac coloration which is modified by a slight shade of orange. The sensitiveness is 1 to 80,000.

m-Cresol deports itself similarly, with a prevalence of the orange shade; the limit is the same as the foregoing.

Thymol gives a splendid purplish-red coloration, with a shade of violet, and, on adding a little alcohol or ether, the colour turns more to violet, but then disappears quickly, being in general less stable than that of resorcin. According to Stoermer, the reaction takes place only on heating, but my experiments showed that it also takes place in the cold, provided the solution be allowed to stand for some time, when the colour will be found more stable than on heating. The intensity of the coloration is greater, when the dilution of the solution is 1 to 1000, than with the cresols and carbolic acid; the limit, however, owing to the colour being easily decomposed, is not more than 1 to 20,000.

Guaiacol gives a strong cherry red coloration with a shade of blue, which colour soon turns to violet blue. The limit is at 1 to 100,000.

Resorcin.—On heating the chloroform gently a cherry red deposit appears on the potassa, while the chloroform itself turns brownish yellow; on continuing the heating the chloroform becomes coloured, too. The red colour is more stable than with the other phenols, and the limit goes to 1 to 500,000. The addition of alcohol interferes the coloration less than with the other substances.

Hydroquinon is soluble with difficulty in chloroform; the well-shaken mixture, in the proportion of 1 to 1000, gives on heating a bluish-green coloration, which is soon decomposed on boiling and turns brown. It is therefore best to heat but a short time, and allow to stand. In the dilution of 1 to 10,000 the coloration is quite distinct, on diluting still more it turns brown, and at 1 to 20,000 it is scarcely brownish.

Pyrogalic acid.—On allowing the solution to stand in the cold with the potassa, the latter becomes coated with a reddish-brown deposit, which gradually acquires a greenish shade. On boiling the coloration darkens, and decomposition takes place, so that the reaction is not so easily observed. It is best to take a 50 per cent. solution of potassa; on standing in the cold a dark reddish-brown coloration takes place, which gradually turns to greenish-brown and finally to dark green. With a dilution of 1 to 300,000 the brown coloration is still distinct.

Beta-Naphthol gives a strong Prussian blue coloration, which turns green and brown. The limit is about 1 to 80,000.

Salicylic acid, *antifebrin*, *antipyrin* and *phenacetin*, as might be expected, when they are pure, do not give the reaction.

Salol gives a red coloration, as does carbolic acid. It will be necessary to boil for some time (adding more chloroform if needed), in order to decompose the compound ether, and then allow it to stand for some time at ordinary temperature.

Betol shows the same bluish-green coloration as beta-naphthol; it will be necessary, here too, to boil, with further addition of chloroform, in order to decompose

the ether. The ether may also be decomposed by heating with diluted sulphuric acid, and then shaken with chloroform, which latter is treated as usual with potassa, and allowed to stand. An especially beautiful coloration is obtained by boiling the betol for some time with concentrated solution of potassa, then adding the chloroform and allowing to stand. This beautiful blue coloration might serve as test for betol, and differs from that of beta-naphthol, by appearing in the cold, without previous boiling, but after standing for a long time; besides being not so strong as with beta-naphthol. Betol is distinguished from salol by the coloration; and it is possible to draw general conclusions as to contaminations from this coloration.

From what has been stated, it follows that the colour reaction with chloroform and alkali is peculiar to the phenols in general, that a conclusion as to a certain definite phenol (as, for instance, carbolic acid, thymol, resorcin, naphthol, for each of which the reaction has been deemed characteristic), is only permissible if corroborated by other tests. The coloration is, however, well suited to inform us whether a mixture contains a phenol or analogous substance; the identification of which can only be arrived at by means of some peculiarities of the reaction, its delicacy, shade of colour, etc., and finally with the help of other tests.

In order to examine food, contents of the stomach, blood, urine, drugs, etc., it is in general best to acidulate with diluted sulphuric acid and distil by steam heat. Most of the substances above mentioned are very volatile at the temperature of boiling water, so that often the first few drops may suffice for an examination. The distillate is shaken in a separating funnel with about 5 c.c. of chloroform, and a fragment of potassa is added to the separated chloroform. If the substance to be examined contains alcohol or ether, the liquid has to be made alkaline and the alcohol or ether is distilled off, when the phenols remain in the residue as alkaline salts. Acidulate and distil, as above directed. The original liquid may, of course, be shaken directly, but the reaction is never so beautiful, nor is the delicacy as great as when the liquid is first distilled. Substances which volatilize with difficulty must be looked for in the residue. In the presence of coloured, reducing, or oxidizing substances, it is in most cases preferable to treat the alcoholic or ethereal extract with animal charcoal at a gentle heat, filter, evaporate off the alcohol or ether, take up with chloroform, and add potassa.

This reaction can also be used inversely to prove the presence of chloroform and chloral (since chloral is converted into chloroform by alkalies). Of the phenols mentioned, beta-naphthol, proposed by Lustgarten, and still better, resorcin, proposed by Schwarz, are the best for this purpose. Iodoform, being so similar to chloroform, may also be detected by the same reaction.

DRUGGISTS AS PERFUMERS.*

BY E. G. BOUGHTON.

As the result of some experience, I wish to say a few words to the enterprising druggists of the land, and if my experience shall prove of any value to them I shall feel that it has not been in vain.

I have noticed in the pharmaceutical literature which has fallen into my hands of late, considerable growing interest in the manufacture of perfumes by the druggist, and while I would not raise a voice to prevent any person securing all the knowledge possible, I would warn all good druggists, even chemists, who desire to engage in it, that it is an art. Any druggist who will study it as such may in time achieve success, but the error of such ambitious ones as are most ready to undertake it lies in the fact that they consider the formulas the main part to be required, while these are only directions to those who already thoroughly understand the methods and materials.

No druggist would expect a farm-hand to take a prescription and make a dozen pills of proper consistence, uniform division and finished appearance, and yet many of them imagine they can take a formula for "white rose," "jockey club," etc., and by securing the materials in the usual channels of trade make a good article. It might happen to be done, but the chances would be as much against it as against the granger rolling pills.

The first and greater difficulty is in securing proper materials. I hazard the assertion from some experience that the majority of the flower pomades in the hands of the drug trade are unfit for use in fine perfumes. Otto of rose that does not contain geranium, rhodium or santal oil is hard to find (these may all be added by the perfumer, but this addition is a part of his profit). Musk is less sophisticated than many products of less value, but the price charged for pure grain Tonquin musk in the drug trade would be ruinous to those who would use it in manufacturing perfumes. Ambergris when bought in small chips seldom has the full quality of odour of the lumps. My experience has been that a quantity of fine chips weighing 1 ounce has not more than half the value of a single piece weighing that amount. Some civet is fit for use in perfumes and some absolutely nauseous, even in combination. An educated nose only can guide the user. Geranium oil in market has odours from that of brown sugar to the freshly-bruised geranium leaf. All the citrine odours have varying degrees of terebinthinate odour, some so slight as not to show in use, others so marked that no one would fail to notice it. Very few sold are absolutely free from it. Orris root, when freshly powdered, has a delightfully characteristic odour, but the violet odour of the fresh specimens is only perceived at a distance through fibre or other mode of dilution that, giving out a violet odour when smelled at, is preparing for the loss of all odour. So might be enumerated the points of comparison in each material, but this is not a treatise.

Regarding the methods: Suppose we have a pound of fine rose pomade No. 36, how many pounds of essence may we expect to make from it, and how will we wash it? Say it costs $2.00, and we wash it with 1 pint of cologne spirit, we will get possibly 12 ounces of fine rose essence, making it cost $3.00 per pint. Violet pomade No. 36 costs, say, $2.75 per pound, making the essence obtained in the same manner cost $4.00. Jasmine and others cost the same as rose. If we dissolve 3 ounces of rose oil, costing $5.50 per ounce, in 1 gallon of cologne spirit, our rose spirit costs $2.35 per pint. Take the formula for white rose (a good one):—

	Quantity.	Costs.
Rose essence. . .	1 pint	$3.00
Rose spirit . . .	1 pint	2.35
Violet essence . .	1 pint	4.00
Jasmine essence .	½ pint	1.50
Patchouli oil. . .	10 drops. ($2.00 oz.)	.04
Alcohol	4 ozs. (30 cts. pint)	.08
	3¾ pints.	$10·97.

We can buy a fine article of white rose for $3.00 per pint in half pint bottles. This is not as pure as the above nor as strong as the true rose, but place the two side by side and one will be surprised to see how many customers will take the article bought for $3·00. As a matter of fact the perfume made by the formula here given is too good; better than necessary to satisfy the trade.

Then the profits are still in the grease; no single washing, however thoroughly conducted, will exhaust

* From the *Druggists' Circular*, February.

even No. 8 pomade, much less No. 36; therefore a second washing is a necessity. How far to carry these processes, and how to manipulate the mixture of grease and spirit without waste, and how to use the spent greases are the most technical branches of the perfumer's art. Most manufacturers have methods of their own devising upon which, in the long run, their success or failure depends. Some saponify these greases, making fine toilet soaps; some sell to soap boilers, and some return to the manufacturers for enfleurage.

It must be apparent that on the small scale the most saturated pomade would be the most economical; if then, as shown, it would not pay, in a small way, to work No. 36 pomade, it surely would not to work the lower numbers.

The formulas are also delusive, no standard strength being acknowledged for tinctures like musk, amber, civet, tonka, vanilla, etc., while the later products, styrone, piperonal, eugenin, etc., are sparingly known and introduced even in perfumers' literature.

The highest branch of perfumery, the handkerchief extract, is perfected by the fullest gratification of the sense of smell, and no one can expect to reach it without thorough education of the nasal organ. Oftentimes the most unpromising compounds, by a single slight addition are transformed into fine odours, while another addition will possibly spoil a well-blended perfume. To know what the probable effect of each addition will be is the art of the perfumer, and cannot be learned from text-books or formulas.

Those odours which have proved most popular in the long run are usually the most simple in formula. Rose is the sweetest, musk the most pronounced, jasmine the heaviest, ylang ylang the most diffusive, and violet the most delicate. The leading compounds are rondoletia (lavender and clove), jockey club (rose, tuberose and civet), new mown hay (tonka and geranium), frangipanni (musk, sandal, orange and vetivert), verbena (lemon grass and lemon), west end (verbena and sandal), heliotrope (vanilla and almond); these have all stood the test of public opinion, and are among those whose formulas are the least complex. Heliotrope is a popular odour and can be made tolerably well and profitably by the druggist. I will give a formula for that odour:—

	Quantity.	Cost.
Vanillon (wild Mexican vanilla)	½ lb.	$0.50
Benzoic acid	1½ drams	.01
Balsam of Peru	1½ ,,	.02
Oil of neroli	1½ ,,	.75
Oil of rose	1½ ,,	1.20
Oil of bitter almond (Allen's English)	1½ ,,	.10
Oil of ylang ylang	10 drops	.15
Tonquin musk (finest)	10 grains	1.00
Orris root	½ lb.	.10
Alcohol 95 per cent.	9 pints	2.60
Orange flower water (triple) .	1 ,,	.15
	10 pints.	$6.58.

The cost is thus 66 cents per pint.

Cut the vanillon in small pieces and bruise them with the orris root and musk to a moderately fine powder, introduce in a covered conical percolator and cover with spirit. When the tincture begins to drop cork the percolator, macerate twenty-four hours and draw off what will run. Again cover with spirit and macerate as before, so continuing until the 9 pints of spirit are used. Displace with water at the last to obtain 9 pints of tincture, add the other ingredients, shake, and after twelve hours filter through 20 grains of carbonate of magnesia on filter paper.

This formula furnishes as good an article of heliotrope as I know how to make without flower essences, the preparation of which I consider the province of the perfumer. Should they be used, the rose oil would be substituted by rose essence, the neroli and orange flower water by orange essence in quantity corresponding to the strength.

A few other perfumes can be made without flower essences, but none that I know have the popularity of heliotrope.

THE AZORES AS A WINTER RESORT.*

BY EMERSON WARNER, M.D.

The Azores, or the Western Islands, as they are frequently called, are located in the North Atlantic, about 2000 miles from Boston, and from 800 to 1000 miles from Portugal, to which kingdom they belong. They lie between 36° 59′ and 39° 4′4 N. latitude, and 25° 10′ and 31° 7′ W. longitude from Greenwich. The average latitude is about that of Philadelphia. Their authentic history begins in the first part of the fifteenth century. All previous accounts of them are apocryphal. Originally discovered and settled by the Portuguese—Moors, Flemings and remnants from other countries are represented.

Thus they are a mixed people and have a mongrel language, based largely upon the Latin, so that their language is spoken of as the youngest daughter of the Latin.

Nine islands form the archipelago, somewhat irregularly situated, running W. N. W. to E. S. E., covering a linear distance of some 300 miles. Much speculation exists in regard to their origin. Some assert they are the remnants of the lost Atlantis; but the evidences of igneous action are so abundant, they are generally regarded as volcanic.

Geologically they belong to the Miocene period, as identified by the stratified rock, and signs of the Glacial epoch are abundant on several of the islands. They are characterized by bold precipitous coast lines, rising rapidly towards the interior, the highest peaks averaging about 3500 feet, though one island, Pico, supports a peak 7613 feet above the sea-level. The same peak below sea-level extends downwards rather more than 16,000 feet.

They have no natural harbours, the business being mainly carried on through two islands, where artificial harbours are being constructed.

They contain a population, according to the census of 1878, of about 260,000, distributed approximately as follows:—St. Michael's, 120,000; Terceira, 45,000; Pico, 26,000; Fayal, 25,000; St. George, 18,000; Flores, 9000; Gracioso, 8000; Santa Maria, 6000; Coroo, a little less than a 1000.

That wonder of the ocean, the Gulf Stream, flows well to the north, and is crossed in going from Boston. The southern branch of the stream flows to the eastward between the islands and the continent, thus enclosing them in its embrace.

This gives them an equable climate. The changes of temperature are extremely slight—that between midnight and midday in the shade not ordinarily over 4°, and between the summer and the winter mean not more than 10° or 15°. The average for the winter months is about 62°, and in summer about 72°. No frosts, no snows, except Pico's head is snow capped a short time in what they call their winter. The view of this peak, five miles distant, has a peculiar charm for the visitor at Horta, the chief city of Fayal. In summer or winter its alluring, fascinating power is never lost.

The houses are built of basaltic lava. Doors and windows are wide open during the day, and the natives use fires only for cooking purposes.

Stoves are seldom seen, and many of the peasants' houses have no chimneys.

The dress of the peasants is coarse island linen, or wool, spun on distaff and woven on hand-loom.

* From the *Boston Medical and Surgical Journal.*

They go barefooted the year through. Small children, sometimes with only one scanty garment, may be seen on the street every day, with head, arms, legs and feet bare.

St. Michael's, the largest of the Azorean group, is about 40 miles in length and 9 to 12 in width. It is a most picturesque island, and abounds in beautiful scenery. Here is located Ponta Delgada, the chief city, and third in importance in the kingdom of Portugal. It is a business centre, with considerable wealth, and contains about 25,000 inhabitants. It is situated on the south-west point of the island, extends two miles along the shore, and is backed by well-cultivated hills. The breakwater, begun in 1861, which will cost well nigh a million pounds when finished, will accommodate one hundred vessels of all dimensions and draught, and constitutes this the chief commercial port of all the islands. Its chief export is alcohol made from sweet potatoes, and all the product is sent to Portugal. They export also beans, maize, oranges, pine-apples and pozzolana, a good cement. Ships in need call here for supplies and repairs. There is mail communication with Europe by mail steamers to Lisbon twice a month and by fruit steamers to England.

Some of the finest and most extensive gardens are here to be seen, filled with trees, shrubs, and flowers from every clime. As frosts are never known, verdant fields and vegetation exist throughout the year. The rich and titled have capacious residences in the midst of extensive grounds beautifully adorned, to visit which strangers and foreigners are ever welcome.

The roads are well-nigh perfect. In the leading cities are fairly comfortable carriages drawn mostly by mules, though there are some horses, but in the rural districts the donkey is the chief beast of burden.

Hotel accommodations are limited and are mostly under Portuguese management. In Ponta Delgada is a small hotel kept by an English family, which is homelike and comfortable. At Fayal, Terceira, and St. Michael's are Portuguese hotels of some pretension, but they have little in common with the commodious and luxurious American hotel.

In the winter months it is sometimes a little chilly and damp, showers are frequent, and one seldom leaves the house without taking an umbrella, as in England and Scotland, but the sun reappears quickly and the ground is soon dry, partly from evaporation and partly from the porous soil which conducts the surface-water quickly away.

Strongs winds at times prevail, and high walls and hedges of incense and fiya trees are required to protect orange trees and other fruit. In summer the prevailing winds are said to be north-east and easterly. In winter they are from the south, south-west and more rarely from north-west and south-east, occasionally accompanied by severe gales, when the temperature falls to its lowest. With the Azoreans winter begins about Christmas. The three coldest months are usually January, February and March. During the winter of '87 and '88 the following is a digest of the daily record of the temperature and weather for the three months of December, January, and February. In December the thermometer was never seen below 60°. Warm, pleasant weather with only light, local showers till the 22nd. This was a wet day, followed by cloudy, showery days till the 25th, when the showers come in squalls with heavy winds, and the 26th and 27th gave gales of wind and rain with low barometer (28·3). No such low barometer or heavy gales and high seas since 1839.

It was a regular blizzard, doing great damage to trees, shipping, harbour, and breakwater. Not more than once in a lifetime will one see such a Niagara sweeping over the breakwater, a structure thirty-three feet in height, and lifting boulders of tons in weight and depositing them on its promenade. During January the thermometer only once stood below 60° —that was January 4th: morning, 58°; mid-day 62° —a lovely day. The rest of the month the thermometer registered from 60° to 66°. The extreme of variation was never more than four degrees in any given twenty-four hours. Only six days gave this variation. Nineteen days gave only two degrees of variation; the remaining days gave only a degree or less. Twenty-two days were without rain unless it might be a slight local shower. Three days only were cloudy and rainy the whole day—the other days were a mixture of sunshine and rain. Of the twenty-nine days of February, eighteen were pleasant and without rain unless a very light local shower. Six days were cloudy and rainy most of the time—the other five days were more or less cloudy, windy, and squally.

Fourteen days of this month were spent at the Furnas, a crater containing valuable mineral waters, bath-houses, etc. Here the thermometer usually registers about four degrees lower than at any other place in the islands. The lowest was 57°. Here as elsewhere, the variation for the same twenty-four hours follows the same uniform rule.

The winter of 1886–87 was milder and more pleasant. May and June with us are seldom more agreeable—the changes there less sudden and great.

Mineral waters are found in several of the islands, but mostly in St. Michael's. In Ponta Delgada is found bottled and on sale one of the most healthful and agreeable of table waters. It issues from a high rock difficult of access—is collected and bottled as it comes from the rock, and its value has only been recognized within a recent date.

It has been analysed in Paris by Ritchie, Professor of Chemistry in the School of Pharmacy, with the following results. In a litre of water was found:— 1 gr., 748 of free carbonic acid, 0·0132 of carbonate of lime, 0·0405 of carbonate of soda, 0·0047 of chlorate of potassium, 0·0189 of chlorate of sodium, 0·0037 of peroxide of ferrum, 0·0030 of peroxide of manganese, 0·0890 of silica. It being less saline than most of the waters extensively advertised, it can be used by a much larger number with advantage. Other mineral waters, found mostly in the crater called the Furnas, are longer and better known.

These were analysed by a French chemist, M. Fouqué. As samples, the analyses of three or four only will be given. Coldeira Grande, a boiling well of about 8 or 10 feet in diameter, seething furiously in a bed of loose stones, and protected by a circular wall some 6 feet high, wells up at the rate of 19 galls. per minute, and its temperature is estimated at 212° F. The rush of gases is considerable, and they probably increase the violence of its agitation, which makes it impossible to take the temperature at the source.

Carbonic acid	988·90
Sulphydric acid	9·50
Nitrogen	1·46
Oxygen	0·14
	1000·00

An evaporated litre of this water left a dry residue weighing 1·818 grams. After the super-oxidation of the sulphate of soda, the weight of the dry residue was equal to 1·767 grams, which, when dissolved, gave:—

Carbonate of soda	0·707
Sulphate of soda	0·025
Sulphate of potash	0·016
Chloride of sodium	0·646
Sulphuret of sodium	0·064
Silica	0·285
Silicate of soda	0·024
	1·767

(*To be concluded.*)

The Pharmaceutical Journal.

SATURDAY, FEBRUARY 23, 1889.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE BENEVOLENT FUND.

THE present number of the *Pharmaceutical Journal* will be distributed to every member of the trade in the United Kingdom, especially with the object of drawing attention to the state of the Benevolent Fund, and of pointing out that, as the benefits of this charity have now been extended to all persons connected with the trade, it is for that reason one which merits general support, not only by those connected with the Society, but also by every chemist and druggist on the Register. The applications for relief from the Benevolent Fund are so numerous that it is found necessary to restrict the grants, both of annuities and of occasional relief, although the Fund has been from time to time subsidized by votes of money from the General Fund of the Society. Apart from legacies and donations, the annual income from subscriptions to the Benevolent Fund does not amount to much more than fifteen hundred pounds a year, and it will be seen from the statement of relief granted during 1888 that the sum distributed amounted to upwards of two thousand pounds, the difference being derived from the interest on invested capital. From this brief summary of the working of the Benevolent Fund it will be evident that if its benefits are to be extended so as to meet more fully the demands made upon it this can only be done by a proportionately increased support in the form of subscriptions. Even for continuing the relief expenditure at the present rate it will be necessary to make persevering exertions to secure the requisite annual income. Another point to be mentioned, as commending the Benevolent Fund to the support of all members of the trade, is the fact that it is almost unique among charities in the small cost at which it is worked, for as nearly all the expenses are defrayed out of the Society's general fund, all the money subscribed is, with the exception of a few trifling charges for printing voting papers, available for the relief of distress.

At the present time the number of annuitants receiving thirty or thirty-five pounds a year from the Fund is fifty-two, the sum thus disbursed amounting to £1705. During the past year occasional relief has also been granted in forty-two cases to the extent of £395, thus making the total expenditure £2100. If the resources of the Fund were more ample it would be possible to extend its beneficial operation considerably, since there are numerous applicants for relief whose cases cannot be entertained for want of means to do so. We trust, therefore, that in placing these facts before those who will receive the Journal this week that we may succeed in awakening a wider interest in the Benevolent Fund, as being an institution that is deserving of their support, one that is capable of doing an immense amount of good for distressed members of their calling, and that is calculated to be a credit to the body at large in a degree even greater than is the case with other charities of a similar nature.

At the moment of going to press we have received a telegram from Birmingham with the information that a meeting of the Council of the Midland Counties Chemists' Association was held at Mason College on Tuesday, the 12th inst., when a resolution was proposed by Mr. G. E. Perry, the President, seconded by Mr. W. Jones, and carried unanimously to the effect that the Council of the Association, whilst heartily approving of the action of the Pharmaceutical Society's Council in regard to the enforcement of a curriculum, is of opinion that additional regulations for the sale of poisons and other matters affecting the safety of the public should be dealt with at the same time.

* * *

In a letter received from Mr. W. R. Hedges, junior, of Birmingham, he mentions that he was unable to obtain an immediate blue coloration when treating solutions of hypophosphites in the manner described by Mr. Millard in this Journal of the 26th ult., but that when a few drops of hydrochloric acid were added an intense colour was quickly developed that was changed by alkalies to green. He also found that on adding protochloride of tin in place of sulphurous acid a blue precipitate was produced, but that this took place even in the absence of the hypophosphite.

* * *

The annual dinner of the Chemists' Assistants' Association will be held in the Venetian Salon of the Holborn Restaurant, on Thursday, February 28, at 8 p.m., when Mr. G. F. Schacht will preside. Tickets may be obtained from Mr. F. A. Rogers, 29, Chapel Street, Belgrave Square, S.W.

* *

The annual meeting of the Chemical Trade Section of the London Chamber of Commerce will be held on Monday next, the 25th instant, at the offices, Botolph House, Eastcheap. The chair will be taken at a quarter past two.

* * *

At the next meeting of the Liverpool Chemists' Association, on Thursday, the 28th inst., Dr. Symes will read a paper on "Gelatine Pill Coating," showing the process in operation, with an apparatus for the purpose.

* * *

The next meeting of the School of Pharmacy Students' Association will take place on Thursday, February 28, at 6.30 p.m., when Mr. H. D. Fuge will read a paper on "Cascara Sagrada," and Miss Buchanan will give a Report on Pharmacology.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

An extraordinary general meeting of this Association was held at the Royal Institution, on February 14, at which it was unanimously resolved, "That the words 'every alternate Thursday' in law 8 shall read 'every alternate Thursday or monthly.'"

The motion, which was put by Mr. T. F. Abraham, gives the Council power to hold general meetings fortnightly or monthly in the future at their discretion.

The first general meeting of the fortieth session was neld immediately after the special meeting, the President, Mr. A. H. Samuel, F.C.S., in the chair. The minutes of the previous meeting were read and confirmed. Several donations were announced, and votes of thanks was accorded to the donors.

Mr. J. S. Ward described a sample of adulterated saffron that had lately been brought under his notice.

Mr. R. Parkinson drew attention to a case of adulterated cream of tartar. He said the cream of tartar had been sold by a grocer and was stated in the daily papers to be adulterated to the extent of 33 per cent., but the adulterant was not mentioned.

Mr. M. Conroy said that a very good and ready test for the purity of cream of tartar is its solubility in excess of liquor potassæ; if pure, it will entirely dissolve.

The President then read his address on—

Petroleum Lamps and Lamp Accidents.

BY A. H. SAMUEL, F.C.S.

Gentlemen,—Before commencing my address to you this evening, permit me at this, the opening meeting of our New Session, to convey to you my best thanks for the honour you have done me in electing me for the second time president of this Association. It has been my good fortune to have taken an active part in the union that has been accomplished under my presidency, of the Liverpool Chemists' Trade Association with our own Association. I believe that this union has already borne good fruit by strengthening our ranks, and placing the Association on a more solid basis than it has enjoyed for many years past. This Association now, more than ever before, may be considered as a representative body of the chemists and druggists of this city. It is not in any way limited to any particular class of papers or discussions at its meetings, but offers an open welcome to all its members to discuss any matter whatever in connection with their calling as pharmacists, whether it be of a trade or pure scientific character.

I was at a loss for some time to find a subject for my second presidential address at the opening of the present session. Should I dilate on that well-worn topic, pharmaceutical education, or should I discuss that equally threadbare question, the present position of the chemist from a commercial point of view? So much has recently been said, both in presidential addresses in London and the provinces on these matters, and the pharmaceutical press has been so deluged with correspondence on the same, that I have come to the conclusion that you might perhaps be even grateful to me if I left these topics in abeyance for the present.

As you are aware, the subjects of several papers which I have had the honour of delivering before this Association have been more or less connected with petroleum, and in contrast to what I have said above, this field of inquiry has found but few explorers, and as I believe I am, from past experience, perhaps better able to bring points of interest on this subject before you than others might, I have once more ventured to take hold of another phase of inquiry in connection with this illuminant.

My object is, firstly, to dispel groundless alarm as to the dangerous nature of petroleum as an illuminant; secondly, to discuss some of the causes which lead to lamp accidents, and, thirdly, to afford some information as to the best means of protection against lamp accidents and so-called "lamp explosions."

Anyone who reads the daily papers has, every now and again, his attention drawn to some unfortunate accident caused by a petroleum lamp, but very rarely is the true cause of such accident given to the public. The usual heading of such paragraphs is "Explosion of a Petroleum Lamp," whereas, as a matter of fact, there is rarely an "explosion" at all in such cases. It becomes, therefore, a matter of importance that the public should have the best information as to the real origin of these lamp accidents, and the best means of, if possible, preventing their recurrence.

We will take as our starting point the oil, and the first question which arises in our mind is this, What safeguards do our Government insist on, in the retailing of petroleum burning oil to the public. In the first place, petroleum burning oil or kerosine is not refined in this country, but is imported either from the United States of America or Russia in its refined state, ready for burning in our lamps.

The Act of Parliament requires that the oil so imported shall not give off an inflammable vapour (petroleum gas), at a temperature of less than 73° F., when excluded from the air, as in the container of a lamp, which is equivalent to not giving off an inflammable vapour (petroleum gas) in the open air at a temperature of less than 100° F.

This literally means that every drop of oil sold in this country must be heated above 73° F. in the container of a lamp before it will give off a gas, which gas will take fire when a flame is brought in contact with it. Under such conditions the oil itself will not take fire if a flame is brought in contact with it, until a temperature of about 105° F. is reached, when excluded from the air, as in the reservoir of a lamp, and in the open air not until the oil is heated to about 120° F. The temperature at which the gas given off by the heated oil takes fire is called the *flashing point*, and the temperature at which the oil itself takes fire is called the *fire test*. These terms are often confused in the popular mind, and it is as well that we should clearly understand the difference between them.

Now, every drop of petroleum burning oil imported into this country has to pass the above tests before it is permitted to be sold retail to the public.

When petroleum oil was first imported into this country, now about twenty to twenty-five years ago, it was anything but safe as an illuminant, and the public were quite justified in their fears respecting the dangers there are in using it. It was badly refined in the first place, which means that many of the highly inflammable hydrocarbons of the crude oil were left in it, and our measures of properly testing it, when it reached this country, were of a very imperfect description. All this has in recent years been completely revolutionized. The refining of the crude oil is at present brought to the greatest perfection. There is an old saying, "Give a dog a bad name and hang him." I trust that the general public of this country are, at this time of day, far too enlightened to entertain for a moment such an old-fashioned prejudice.

The tests which I have already explained, and which are rigidly enforced by the Government under heavy penalties, enable me to declare that every drop of petroleum oil imported now into this country on passing into distribution for the use of the public is perfectly safe for burning in our lamps, as far as the oil itself is concerned.

There is, however, another product of petroleum which must on no account be confounded with petroleum *oil*, namely, petroleum spirit, commonly

called benzoline, which is sold in the shops for use in lamps specially constructed to burn it, and this *is* highly inflammable, and the public should be cautioned against using this spirit at all for domestic purposes, as it requires handling with the greatest care, and is the cause of many of the accidents wrongly attributed to petroleum oil. The Petroleum Act enforces stringent and special regulations in regard to the storage and sale of this benzoline, none of which restrictions are applicable or any way necessary for the sale of petroleum oil. Taking, therefore, for granted, as we are bound to do, that the petroleum oil in our lamps is in every respect perfectly safe for illuminating purposes, it is idle to say that we will discontinue to use the oil, simply on account of occasional accidents in the manipulation of the vehicle we use for burning it.

Petroleum has now taken the place of every other illuminant as the cheapest and most brilliant light for the million in every part of the civilized, and even in the uncivilized parts of the earth. The world's consumption for burning purposes is now estimated at more than 2,000,000 of gallons every day of the year, or over 730,000,000 gallons per annum, and is yearly increasing, notwithstanding the improvements made in other illuminants, and the more recent introduction of electricity. In point of economy, healthfulness and brilliancy and convenience, it is unsurpassed by any competitor.

If, therefore, as I have endeavoured to demonstrate to you, it is not the oil that is the cause of the unfortunate accidents and occasional fatalities that occur in connection with burning same, it must be to our lamps and our imperfect knowledge in manipulating them that we must look as the true cause for these accidents, and this brings me to the second portion of my paper.

The proper construction of a petroleum lamp is of the first importance. I may tell you that this question is now under the consideration of the Government, as will be seen from the following circular, issued on January 12 last from the Home Office from Colonel Majendie to Sir Frederick Abel, directed more particularly to the various lamp manufacturers.

"Home Office, *January* 12, 1889.

"Sir,—As it is probable that the prohibition of the sale of mineral oil lamps of a dangerous construction may be urged in connection with the pending legislation in relation to petroleum, and as the subject of mineral oil lamp construction occupied the attention of Mr. Boverton Redwood and yourself four or five years ago, when the results of your investigation and experiments were embodied in a series of practical suggestions, which were circulated by the Metropolitan Board of Works, and reproduced in the Annual Report of H.M. Inspectors of Explosives, for 1885 (pp. 68–69), I think it would be extremely valuable if we could obtain information as to the extent to which those suggestions have been voluntarily adopted by the trade, and I will, therefore, ask you, in conjunction with Mr. Boverton Redwood, to be so good as to inform me whether you are aware if these suggestions have been generally—or to any large extent—adopted; and if you are not in possession of sufficient information on the point, I shall be extremely obliged if you will take such steps as may suggest themselves, with a view to obtaining the necessary information."

The practical suggestions referred to were issued by the Metropolitan Board of Works four years ago, viz., in 1885, and as far as the construction of lamps is concerned are as follows:—

1. That portion of the wick which is in the oil reservoir should be enclosed in a tube of thin sheet metal, open at the bottom; or in a cylinder of fine wire gauze, such as is used in miners' safety lamps (28 meshes to 1 inch).

2. The oil reservoir should be of metal, rather than of china or glass.

3. The oil reservoir should have no feeding-place nor opening other than the opening into which the upper part of the lamp is screwed.

4. Every lamp should have a proper extinguishing apparatus.

5. Every lamp should have a broad and heavy base.

These instructions, I understand, were pretty generally circulated, but they do not seem to have attained the object they had in view.

I am of opinion also that legislation in this direction can only be effectually enforced (if it can be enforced at all) within very circumscribed limits. No amount of legislation will stop lamp accidents, no more than legislation will stop railway accidents. The remedy, I think, lies more in the direction of the education of the masses as to the nature of their lamps and how to use them, and the necessary qualification of a safe lamp, and also ventilating as widely as possible, through the press, the danger that is run in buying cheap trashy petroleum lamps.

An ordinary petroleum lamp consists of a container for the oil, called also the reservoir or font, a wick, a burner, through which the wick passes, and a glass chimney, to control the draught of air that circulates around the flame, and thereby produces complete combustion of the oil that rises in the wick. Every lamp ought also to be provided with such a base as will support it from being easily tilted over, and also be provided with some sort of self extinguisher.

Now I have stated that a true explosion is of very rare occurrence in connection with a lamp accident, but if one really does take place the following is probably a cause of it. Let us suppose the reservoir of the lamp is full of oil when the lamp is started burning. As the oil gets consumed a vacant space is produced in the upper part of the reservoir. The heat communicated by the burner and its surrounding parts causes more or less evaporation of the oil in the reservoir, and the gas given off remains confined in the vacant space in the upper part of the reservoir. If there is an imperfectly fitting wick in the wick tube an aperture may be left through which the flame may be able to pass down into the reservoir drawing with it the air and the flame, igniting the explosive mixture formed by the gas and air combined, and bursting the container, if it be of glass or other fragile material; the oil runs out, is heated further by the contiguous flames of the burning gas, and at length takes fire.

I say an explosion such as above described is of very rare occurrence. There is not the least reason why such an explosion should not be rendered practically impossible. Various inventions have recently been brought out with this object, but many of them, although excellent and completely effective, are by reason of cost applicable only to the more expensive class of lamp, beyond the reach of the poor and industrial classes.

The suggestion of the Board of Works seems to be as practical as any, viz., that the portion of the wick which dips in the reservoir should be enclosed in a tube of thin sheet metal open at the bottom, or in a cylinder of fine wire gauze, such as is used in miners safety lamps. And this suggestion has in addition the advantage that it can be applied at but a very trifling cost.

I have before you a lamp which has been fitted with a safety tube, which I think is if anything an improvement on the one above described. It is made of brass, just wide enough to hold the wick, but instead of the tube being open at the bottom, as above recommended, it is closed, and to feed the wick with oil, one or more very small holes are drilled in the bottom of the tube (according to the size of the wick being used), which are just sufficient to allow the right quantity of oil to

pass through into the wick as it is being consumed in the flame. The inventors (Messrs. Crowley and Co.) of this city, claim that the advantage of the tube being closed at the bottom is, that if the lamp be upset it prevents a rush of oil to the flame, which might occur if the tube were open at the bottom. The makers will fit this tube to any flat wick burner, at a cost of from 3*d.* to 6*d.*, according to the size of the burner.

For circular wick burners, which are used with the more expensive lamps, one of the best for safety is a kind made by Wright Butler, of Birmingham, called the "Harvey" patent safety burner, 6*s.* retail. I have one on the table. The wick is fed from the bottom of the cylinder, which is constructed in such a manner that it is absolutely impossible to wind the *lighted* wick into the reservoir. The air is admitted at the top of the cylinder, down which it traverses before ascending to the centre of flame.

A not uncommon form of lamp accident is somewhat as follows:—A lamp which has been burning for some time in a warm room is lifted from its place and taken out of the room, when the sudden rush of cold air upon the heated chimney causes the latter to fly or crack. The report made by this startles the holder, causes him or her to drop the lamp, and if the reservoir in which the oil is contained be glass or china it is generally broken, and the oil escaping gets ignited.

Accidents resulting in the fracture of the oil reservoir may occur in various other ways which it is not necessary for my purpose that I should recapitulate here. This class of accident might be rendered almost impossible if the public would only purchase lamps having a reservoir made of metal or other non-fragile material.

I lay special stress on the importance of the oil reservoir being made of metal, as it renders both classes of accidents already described almost impossible. Should the lamp be overturned or dropped the oil cannot readily escape, and there is ample time to set it up again, even supposing the flame is not extinguished by the fall.

It has been pointed out that there is one inconvenience in using metallic reservoirs, and that is, that the oil is not visible, and therefore that there is nothing but the waning flame to indicate the necessity for re-filling the lamp. This, however, does not constitute a practical objection, since the lamp should be always filled with oil before it is lighted.

Now I may be told that it is all very well to state what are the necessary qualifications to render a lamp accident a thing of extreme rare occurrence, but are such lamps within the reach of the purse of the industrial classes? A large number of lamps that the working classes buy cost retail about 6*d.* and some as low as 4*d.* They are, to my mind, anything but safe. I have often seen them. They are chiefly of foreign make with glass or porcelain reservoirs so fragile that they are shattered with a slight blow. The base is so badly made that overturning very readily occurs, and they are fitted with badly-made burners. What more likely than that such lamps should get out of order almost immediately after they have been in use, and they have all the elements of danger in them?

A poor man's lamp should be more strongly constructed than the rich man's, for the reason that his one lamp is often the sole light at night in his home, and is constantly being carried from one room to another. Is it worth anyone's while to run the risk of fire and accident for the sake of a few pence?

I have on the table a lamp made by Wright Butler, which should be certainly within reach of the working classes. Its price retail is 2*s.* complete with chimney. It consists of a solid square metal base, a polished brass reservoir, having no opening except the one through which passes the wick, and a well-made extinguisher burner. A lamp constructed such as this I consider a perfectly safe working man's lamp.

Another lamp quite within reach of the working classes, costing retail about 1*s.* 6*d.*, is made by Defries, of London. The principle of its safety lies in the burner. It is provided with a wick tube of wire gauze, similar to that suggested by the Metropolitan Board of Works, which wire gauze tube is lined with a porous material, inside which the wick is placed. It is also provided with an extinguishing apparatus which acts automatically, and puts out the lamp on its being overturned or upset.

There are other equally as safe cheap lamps being now made by the various English lamp manufacturers, but the above will be sufficient for my purpose to illustrate what I would suggest as the cheapest lamp that ought to be purchased, if the public desire a *safe* light in their homes.

Having now described what in my opinion constitutes the main principles of a petroleum safety lamp, it is a matter of frequent occurrence to us all that we cannot get our lamps to burn satisfactorily. They either smoke or smell, or the flame diminishes, or goes out altogether.

Now although it is not within my province to offer a complete remedy for all these various contingencies, perhaps a few remarks from me on the parts of the lamp and their manipulation may be of some advantage in remedying same.

In the first place as to the wick. This is a very important part of a lamp, and one on which its burning power mainly depends. The wick should be of soft texture, of long staple and loosely plaited, as its capillarity or power of freely drawing up the oil is then at its best. If the wick be tightly plaited or of soft staple its capillarity becomes impaired, and the user of the lamp has to increase the length of that part of the wick exposed to the flame, and charring takes place more rapidly, destroying the porosity of the ends of the wick, and thereby diminishing the illuminating power of the flame. The wick should be dried before being fixed in the lamp. If the wick be at all damp, or if the oil accidentally contain any water, the capillaries of the fibre become more or less filled with moisture, and its power of conveying oil to the flame becomes diminished.

The wick should be changed periodically, as the slight impurities (which are present in almost all petroleum burning oil) are deposited within the wick, and tend to reduce its capillary power. It is also shown that the *copious* supply of oil to the wick becomes reduced in proportion as the oil in the reservoir is lessened, and that is one reason (in addition to that of safety) for keeping the reservoir of the lamp always as full as possible. The wick should be of such a size as will completely fill the wick tube without having to be compressed into it. It should also be soaked with oil before being lit. So much for the wick.

Now as to the burner. This part of the lamp should always be kept scrupulously clean. For this purpose it should be frequently removed from the lamp and well washed with soda and hot water to ensure all of its numerous air holes being quite free from dirt, causing its ventilation to be defective. Any choking of these air holes causes extra heating of the burner during combustion, and this may lead to accidents, besides diminishing the illumination of the lamp.

Avoid cheap burners. Those made by English makers of repute are reliable, and constructed on proper scientific principles, and usually have the name of the maker attached on them. As to the best kind of burner to use, this must be left to the requirements of the buyer. The duplex is a useful kind for those requiring a large flame, and a still more brilliant light is obtainable from the circular flame or kosmor burner. I have already drawn attention to special safety burners.

As regards the chimney,—there is not much need to be said about this part of the lamp. I would suggest

always using the very best quality, as an ill fitting chimney may alter the air supply, by admitting a current underneath it, while one of common quality is liable to break at any moment, causing annoyance and confusion. See that the chimney is of a shape suitable to the burner, otherwise the development of the flame may be impeded by altering the air-draught.

A perfect flame should be tulip-shaped and square at the top, it should not be pointed in the centre. If a flame is forked it may be remedied by taking a little off the corners of the wick.

In cutting the wick of a lamp that is in use remove merely the charred part.

Now as to the extinguishing the lamp. Various arrangements have been recently invented for this purpose; some work automatically and others by pulling a small lever attached to the burner.

Every lamp should be provided with an extinguisher of some kind; but in case there is none, the safest method of putting out a lamp is to turn down the flame and blow sharply across the top of the chimney, not down it.

In concluding this address, I beg to thank you for the indulgence you have granted me, in listening to same, more particularly in view of the fact that I have gone out of the beaten track, in introducing to you a subject not in any way of a pharmaceutical character, but one which may, notwithstanding, have not been without some practical interest to you.

At the close after some discussion in which Messrs. Symes, Conroy, Bain, Hocken and others took part, a very hearty vote of thanks, proposed by Dr. Symes, seconded and put to the meeting by Mr. Conroy, was given to the President for his valuable address.

The President replied and the meeting terminated.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

A meeting of the Midland Counties Chemists' Association was held on Tuesday at Mason College, Birmingham, the President (Mr. G. E. Perry) occupying the chair.

There was a large attendance of members.

Moot Points in Dispensing.

The discussion on Mr. Jones's paper on "Moot Points in the Dispensing of Prescriptions," which was adjourned from the last meeting, was resumed, and the following resolution carried:—"That the question of the interpretation of the ordinary sign 'Oss' be referred to the Council of the Midland Counties Chemists' Association for their consideration."

Mr. F. H. Prosser read the following paper:—

Remarks on the Colour of Ferri Citras c. Strycninæ.

BY F. H. PROSSER.

About twelve months or more ago I received a prescription to dispense as follows:—

℞ Ferri citras c. strych.	℥ij.
Spir. chlorof.	℥iss.
Infus. quassiæ	ad ℥viij.

M. ℥j. ter die

The mixture when dispensed was of a light green colour.

In a little while the mixture was returned with the remark that it had been wrongly dispensed, it having been previously dispensed (by an historic house in the centre of the city) of a dark red colour.

I had some difficulty in persuading the customer that the mixture was identical in composition if not in colour.

At the adjournment of the discussion last month members were asked to bring forward any difficulties they might have met with in dispensing, and this is one which came across my mind.

I have through the kindness of Messrs. Howards and Son, Fletcher, Fletcher and Stevenson, Evans, Sons and Co., Wright, Layman and Umney, Hearon, Squire and Francis, and Jas. Woolley, Sons and Co., been able to bring before you various makes and shades of this preparation, as well as samples of other scale preparations, which I have pleasure in showing. I have made solutions of several containing, as in the prescriptions alluded to, 5 grains to the ounce, and you will see the various shades of colour ranging from a very pale green to a deep ruby red. These colours, I find, are not of so strong a colour by gaslight as in the daylight.

The solution marked "Southall B" is one I obtained from Messrs. Southall soon after dispensing the prescription. I procured another sample a few days ago, and this marked "Southall A" is identical in colour with that made from Messrs. Howards' salt.

I should like to ask whether they have given up making the ruby-red salt, or whether they still make both.

Messrs. Wright, Layman and Umney, in sending their samples, remark that the darker salt is made by a formula similar to one published in the old edition of the United States Pharmacopœia.

Chlorodyne.—The other subject which is down on the paper for me to introduce is "chlorodyne."

What should be dispensed when chlorodyne is ordered in a prescription?

I always used Collis Browne's until the tinct. chloroformi et morphinæ was introduced into the Pharmacopœia, which, as I understand it, was inserted as a definite substitute for the indefinite, or unknown formula of such an unlimited number of preparations.

If it was not, what was it introduced for?

We know what we are dispensing when we use it, and the medical man knows what he is prescribing. It is called by the 'Extra Pharmacopœia,' "the equivalent of chlorodyne."

GLASGOW CHEMISTS' AND DRUGGISTS' ASSOCIATION.

Assistants' Section.

The Assistants' Section of the Glasgow Chemists' and Druggists' Association met in the Religious Institution Rooms on Thursday, February 14, when papers were read by Mr. T. Robinson and Mr. J. McTurk.

Speaking on "Homœopathy, allopathically viewed," Mr. Robinson, who stated that he had been nine years employed in the allopathic portion of the trade, and two in the homœopathic, gave it as his opinion that homœopathy was daily gaining ground in this country, and that, in spite of opposition, it was forcing itself into public notice. After giving a brief biographical sketch of Hahnemann, its founder, he referred to the difficulties thrown in its way by allopathists, who, while condemning it, did not scruple to use its methods. He (Mr. Robinson) had seen one of the most prominent men of that school use, with effect, 1 minim doses of medicine. In conclusion, he considered that homœopathy was to be preferred for its simplicity and efficiency, as instanced by daily recorded cures.

In the discussion that followed, Mr. J. P. Gilmour remarked that cures proved nothing. They had instances of that in the case of Sequah, and more recently the cases of faith-healing at Dalbeth. Homœopathists had discovered nothing that was not known to the ancients.

Mr. Robb thought at least some good had been done by the discontinuance of blood-letting, which they (the homœopathists) brought about.

Mr. Robinson, in reply, said that for those who

wished to go further into the *pros* and *cons*, he would recommend "Odium Medicum," a pamphlet recently published.

A paper on "Hugh Millar," by Mr. McTurk, was well received, after which the meeting broke up.

The next meeting will take place on the 25th current, when Professor H. Sexton will lecture on "John Dalton and the Atomic Theory," illustrated by limelight views.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

A general evening meeting of this Society was held in the rooms, Fitzalan Square, on Wednesday, February 13, the President, Mr. Learoyd, in the chair.

A paper was read by Mr. J. O. Arnold, F.C.S., on "Various Methods of Volumetric Analysis." The essayist briefly explained the general methods of volumetric analysis, and then gave a practical demonstration of the new method of the estimation of sulphur in iron and steel by means of an ingenious apparatus of his own design. The apparatus consists of fifteen tubes about 75 mm. long by 12 mm. diameter, in each of which is placed 2 c.c. of an acid solution of lead acetate. Each tube thus contains a quantity of lead sufficient to fix as sulphide ·01 per cent. of sulphur in 2 grams of steel. In each tube is inserted an exit and inlet tube; the latter is bulbed near the end, and is 1 mm. smaller than the tube. By means of this device perfect absorption of H_2S gas is obtained. To the series of tubes is connected a flask which contains the iron or steel and distilled water, and this again is connected with a cylinder containing pure hydrogen. The air is drawn from the tubes by aspirating the hydrogen through them. The gas-holder tap is now shut and dilute sulphuric acid (1in 4) run into the flask from a separator, the aspirator tap being opened. Gentle heat is next applied until the iron or steel is dissolved and H_2S ceases to come off; hydrogen is again aspirated through the apparatus. As the operation proceeds, one by one the contents of the tubes will blacken, each tube precipitated representing $\frac{1}{100}$th per cent. Therefore the reaction is self-indicating, and all that remains to be done is to count the precipitated tubes.

At the conclusion of the paper a hearty vote of thanks was accorded to Mr. Arnold.

Previous to the reading of the paper, Mr. England was elected a member, and Mr. Dalton an associate, of the Society.

Proceedings of Societies in London.

CHEMICAL SOCIETY.

At a meeting of the Chemical Society on Monday, February 7, Mr. W. Crookes, F.R.S., President, in the chair, several certificates were read for the first time, and the following papers were read:—

Researches on the constitution of Azo- and Diazo-derivatives. V. Compounds of the Naphthalene-β-series (continued). By R. Meldola, F.R.S., and G. T. Morgan.

The Action of Nitric Acid on Anthracene. By A. G. Perkin.—Experiments on the preparation of nitro-derivatives of anthracene have up to the present failed, owing to the fact that when anthracene is treated with nitric acid, oxidation and nitration take place simultaneously, the products being anthraquinone and nitro-anthraquinones. Nitro-derivatives of anthracene may, however, readily be prepared, provided that during the interaction of the anthracene and the nitric acid care is taken at once to decompose any nitrous acid which may be formed. If anthracene be gradually added to strong nitric acid (which has been carefully freed from nitrous compound by boiling it with urea), it is quickly converted into a new yellow substance, which after recrystallization from coal-tar naphtha proved on analysis to be *dinitroanthracene*. This may also be prepared by the addition of anthracene to nitric acid diluted with nitrobenzene or the nitrates of the pyridine bases. Dinitroanthracene crystallizes in long, brilliant, yellow needles, which are difficultly soluble in the ordinary solvents. Heated in a test-tube, it sublimes apparently without decomposition, but on long heating it is converted quantitatively into anthraquinone, with evolution of nitrous fumes, a proof that its constitution is represented by the formula $C_6H_4{\cdot}C_2(NO_2)_2{\cdot}C_6H_4$. The same change takes place when dinitroanthracene is oxidized with chromic acid, and also when it is exposed for some weeks to the action of sunlight. *Mononitroanthracene* is contained, together with anthraquinone, in the mother-liquors from the preparation of dinitroanthracene. It crystallizes from naphtha in small yellow needles, which are more readily soluble in this solvent than dinitroanthracene, but not so soluble as anthraquinone. *Diamidoanthracene* is readily obtained by adding dinitroanthracene to a boiling solution of sodium sulphide in alcohol, and precipitating the resulting violet solution with chlorhydric acid.

The Preparation of Glyceric Acid. By T. Lewkowitsch, Ph.D.—Debus (*Annalen*, cvi., 79) and Sokoloff (*Annalen*, cvi., 85) recommend preparing glyceric acid from its repeatedly recrystallized calcium salt by means of the requisite quantity of oxalic acid; Mulder (*Ber.*, xiii., 1902), however, has proposed the use of lead glycerate and its treatment with sulphuretted hydrogen. When recently preparing a quantity of glyceric acid, the author has found that it is impossible to completely convert the lead salt in the way indicated by Mulder, part of the lead remaining dissolved. A great number of experiments, carried out under various conditions, led all to the same result. It is therefore necessary to return to the old prescription of Debus and Sokoloff, viz., to prepare glyceric acid from its calcium salt by means of oxalic acid.

The Relation of Cobalt to Iron as Indicated by Absorption-spectra. By W. J. Russell, Ph.D., F.R.S., and W. J. Orsman, junr.—It is well-known that when examined spectroscopically, some coloured metallic compounds are found only to produce a general absorption, but from previous observations it seemed possible to the authors that in some cases at least this might be resolved into bands by employing more powerful chemical agents than are generally used in such cases; experience had indicated that the chloride is usually the most suitable salt, and that it should be dissolved in chlorhydric acid and the liquid saturated with hydrogen chloride, also that, if possible, ether should be taken as solvent. Applying these views to iron, it was found that ferric chloride gave a banded spectrum strikingly similar to that of cobalt chloride. Irons of all kinds were examined; pig iron, commercial cast iron, and various manufactured articles; steel in the form of wire, needles and knives, and a number of specimens of reputed pure iron, viz., Demidorff's sheet iron, a sample of which was kindly given to the authors by Mr. Crookes, electro-deposited iron, and some ancient Indian iron from Professor Roberts Austen, and iron prepared by the late Dr. Matthiessen. Also a large number of iron ores—hæmatite Elba ore, Welsh bog ore, micaceous ore, ordinary spathic ore, a spathic ore found in cryolite, for which the authors have to thank Dr. Müller; giderite, pyrites from the chalk, wolfram and rouge. Iron was also separated from the ignited residue of blood. All the specimens examined gave the same result. The iron spectrum in general appearance closely resembles the cobalt spectrum, but the band which in

cobalt is at 605 is slightly shifted nearer the blue; there appears also to be a shift in the 501 band, but in the opposite direction. It was found that ether always dissolved out of the ferric chloride a substance which gave a band of extraordinary intensity, exactly agreeing in position with the 530 band in the cobalt spectrum; further, that on increasing the strength of the ethereal solution, other bands became visible agreeing with the bands observed in the strong chlorhydric solution of ferric chloride, and differing only in the case of the 690 and 655 bands which in the ethereal solution were nearer the blue. For a variety of reasons the authors believe that this spectrum does not arise from the presence of cobalt in the iron. In the first place there is a constant difference between the two spectra, as shown in the position and appearance of the band at 597. A trace of cobalt dissolved along with the iron gives the same spectrum as pure cobalt dissolved in chlorhydric acid. Again, on gradually increasing the strength of a pure cobalt chloride solution, the bands in the red are the first to appear, and the band at 530 is not visible until the general absorption has crept up as far as 580, completely blocking up the red end of the spectrum; in an ethereal solution from iron, on the contrary, this 530 band is the first to appear, and the bands in the red only become visible in comparatively strong solutions. Ether extracts the band-giving substance from the ferric chloride with great ease; but it abstracts nothing from the cobalt chloride. Again, on dissolving iron in chlorhydric acid, no bands are visible, and so long as the iron is in the ferrous state even ether extracts no band-giving substance; but on converting the ferrous into ferric chloride by nitric acid, or potassium chlorate, etc., the band-yielding substance is at once apparent. A known weight of Mr. Crooke's Demidorff iron was converted into chloride and dissolved in a known volume of ether, and the intensity of the bands compared with those given by cobalt chloride dissolved in a similar bulk of chlorhydric acid; it was found that approximately it required a weight of cobalt equal to that of the iron to give bands of similar intensity.

Mr. J. Norman Lockyer said that some years since, in a paper communicated to the Royal Society, he had suggested that there were many different molecular groupings of the same element possible, and that spectrum analysis would disclose these; if the same molecular grouping were demonstrated in several substances, then undoubtedly there was a common constituent. If the bands described by the authors represent a substance common to iron and cobalt, it should be possible to obtain spectroscopic evidence of its presence at some temperature on volatilizing the metals; although he had not fully studied cobalt and nickel comparatively, he had, in fact, found that under certain special conditions some of the spectroscopic appearances were common to both, and in such a marked degree as to render it improbable that they were caused by impurities.

Dr. Perkin referred to the non-appearance of bands in an alcoholic solution of purpurin, and their appearance in an ethereal solution, as an illustration of the influence of the solvent.

Dr. Armstrong remarked that the slight shift of the bands which had been referred to did not necessarily indicate that different substances were primarily the cause of the absorptions, as it was well known that such effects were observed on employing different solvents; the absorbing substance might in the one case be held in combination more firmly than in the other; this view was in harmony with the statement that ether did not extract the band-yielding substance in all cases.

Dr. Russell in reply said that not the spectrum as a whole, but only one of the bands was shifted. His view was that the solvents had broken up the substances into a finer state.

Note on Methyl Fluoride. By NORMAN COLLIE, Ph.D., F.R.S.E.—Messrs. Moissan and Meslans have recently described (*Compt. Rend.*, Dec. 31st, 1888) a new method of preparing methyl fluoride; but they do not seem to be aware that this substance had already been obtained in a state of purity (Lawson and Collie, *Chem. Soc. Trans.*, 1888, 626); the opportunity is therefore now taken to describe further experiments made with the gas.

The Nitration of Naphthalene-β-Sulphonic Acid. By HENRY E. ARMSTRONG and W. P. WYNNE.

The Action of Bromine and Chlorine on the Salts of Tetrethylphosphonium. By ORME MASSON, M.A., D.Sc. (Edin.), and J. B. KIRKLAND, the University of Melbourne.

The Preparation of the Salts of Triethylsulphine Tetrethylphosphonium, and Analogous Bases. By ORME MASSON, M.A., D.Sc. (Edin.), and J. B. KIRKLAND, University of Melbourne.

ROYAL INSTITUTION.

ELECTROSTATIC MEASUREMENT.

A lecture on electrostatic measurement was given on Friday, the 8th inst., by Sir William Thomson. The lecturer premised that by this term was understood the measurement of an electrostatic subject by means not necessarily themselves electrostatic. As to the term static, he explained what were present ideas on the subject and how they might be totally changed with increased knowledge of facts: for instance the energy of the compressed air in an air-gun was formerly considered static, but now it is believed to be due to the impact of molecules moving at a rate of about 500 metres per second, and, therefore, decidedly kinetic. The distinction between static and kinetic energy was illustrated by the idea of a piece of stretched india-rubber and a pellet, the stretched india-rubber representing static energy, which, when motion was communicated to the pellet, became kinetic. But it was not improbable that in a few years time the static energy of the india-rubber might be discovered to be really kinetic in character, like that of compressed air. He grouped the methods of measurement of electrostatic energy into three classes, kinetic, electro-magnetic, and purely static, according to their character, and compared the measurement of electric potential to that of pressure in a water supply. To most people the quantity only of a water supply was of importance, and the pressure mattered little except for special purposes, such as driving machinery, but in the not very distant future, when every house had electricity laid on, it would be important to ascertain that its potential as well as its quantity was sufficiently great. The pressure of a water supply might be ascertained by measuring the quantity flowing through a given orifice in a given time, or again by allowing it to flow through a long worm and measuring the heat produced, then calculating by Joule's equivalent. Methods of measuring electric potential analogous to these formed the first of the three classes. The principal method of this description consisted in passing the current through a fine wire of definite length and resistance and measuring the elongation produced by rise of temperature. A platinum silver wire four feet long was employed and its image thrown on to a screen. On passing a current of about 69 volts from a dynamo through the wire the image was seen to lengthen about six inches and remain slightly vibrating in time with the beats of the engine. The case in which the wire is fixed is constructed so as to remain of constant length when its temperature rises, to avoid the error which would be caused by its expansion. The second, or electro-magnetic class of methods for electrostatic measurement had no analogy in methods of measuring water pressure; they depended

on inductive action. Two or three instruments of this class were shown and explained, one being a portable form designed for marine use, and not easily deranged by shocks or rough usage; it consisted of a small oblate spheroid of soft iron, suspended by means of a platinoid wire in the centre of a coil, the electrification of which tends to rotate the oblate bit of iron, which carries round with it a needle on an index. Platinoid was explained to mean platinum, with which tungsten had first been incorporated, and then roasted out again, leaving it considerably altered in resistance and elasticity, although the chemist could not detect the presence of tungsten. The third or purely static method resembled the measurement of water-pressure by the method which would most naturally occur to the mind, viz., direct measurement of the force it exerted on a given area. An example of this was the quadrant electrometer, which consisted essentially of two pairs of brass quadrants, the opposite ones being connected to each other and to one of the terminals, with a light vane, carrying a pointer, pivoted between them. Previous forms of this instrument had auxiliary magnets to govern the vane, but in the instruments shown these had been dispensed with, the lower end of the vane being weighted with movable weights, according to the potential to be measured; each division on the scale corresponded to a certain number of volts, according to the weight used. By increasing the number of quadrants greater sensitiveness was obtained, and a little instrument of ten series of quadrants was shown, which measured small potentials such as the tenth of a volt. A great practical advantage of this class of electrometer is that it does not consume any of the current as the others do, and as the electrometer should be always in use in electric light supplies, this was a question of some importance. The lecturer further alluded to Maxwell's theory of the electro-magnetic nature of light, and the fact that the number of electrostatic units contained in the electro-magnetic unit corresponded in a remarkable manner with the velocity of light (300,000,000 metres per second). He described experiments very carefully conducted in his laboratory, which gave figures very closely corresponding with these.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, February 7, Mr. F. Browne, Vice-President, in the chair. The first paper read was the following:—

Notes on Mercurous Iodide.

BY W. ALLEN.

This salt, though no longer official in the British Pharmacopœia, is still occasionally prescribed, and on account of being much more rarely required, samples are likely to be kept longer in stock, and the average age to be considerably greater than formerly. It was thought desirable to test a few specimens of different dates, and see the extent of decomposition that they had undergone. Some experiments have also been made to compare the different methods which have from time to time been proposed for its preparation, which are as follows.

Yvon recommends a wet process, based on the observation that glycerine prevents the decomposing action of H_2O on mercurous salts. He gives the following directions. Dissolve mercurous nitrate in glycerine, dilute with water and filter, then pour a solution of iodide of potassium into the filtrate, allow the precipitate to settle, and continue washing until a drop of the filtrate ceases to leave a residue, when evaporated on platinum foil. The solution of iodide of potassium must be poured slowly, and under constant stirring, into that of the mercurous-nitrate, and not the latter into the former; care must also be taken that the solution of iodide of potassium is not alkaline, and should it be so, it must be made neutral, or very faintly acid by means of acetic acid. This produced a very fair result, and is easily accomplished.

Le Canu's process is as follows. Triturate the mercury with a little alcohol until finely divided; to this iodine is added in small proportions, and the whole triturated as rapidly as possible. This, he says, "produces a very fine specimen, and does not need washing with alcohol," but I cannot express an opinion upon this process, as I have not performed it practically.

Jules Lefort's process is based upon the solution of mercurous acetate in solution of pyrophosphate of sodium. He gives the following method. Sixty grams of very pure crystalline pyrophosphate of sodium are dissolved with heat in 300 grams of distilled water; and after the cooling of the solution 30 grams of mercurous acetate are added, and the mixture is left to react at the ordinary temperature for several hours, agitating occasionally.

If the pyrophosphate be chemically pure the mercurous acetate is completely dissolved without the least decomposition; but this, he says, "is not usually the case," because the solution of pyrophosphate and mercurous acetate very often contains a little mercuric acetate; this, toward the end of the process will be seen colouring the mass of the solution pale red, but can be easily removed by adding slight excess of iodide of potassium, which in this state of dilution does not decompose the mercurous iodide. The precipitate can be washed with alcohol to ensure the absence of mercuric iodide. The solution of pyrophosphate of sodium and mercurous acetate is filtered and added to another volume of distilled water, and the solution of iodide of potassium added a small quantity at a time with agitation. This produced a very good specimen, but I prefer Yvon's process, because the salt is much more easily prepared.

Maisch made several investigations with regard to this salt, as one or two chemists stated that it could be made by the double decomposition of iodide of potassium and mercurous chloride. He made three experiments, which were as follows:—

No. 1. The mixed powder of iodide of potassium and mercurous chloride was rubbed with boiling water, immediately thrown on a filter and washed with warm water.

No. 2. The powder was treated with cold water, occasionally stirred, filtered after half an hour, and washed with cold water.

No. 3. After the rubbing with sufficient cold water the product was instantly filtered and rapidly washed with cold water.

He then calculated that 60 grams of mercurous chloride must produce 83 grams of mercurous iodide; 41 grams of iodide of potassium ought to decompose $58\frac{1}{3}$ grams of mercurous chloride. Consequently by the above proportions $1\frac{2}{3}$ grams of mercurous chloride would be left unaltered, and the obtained product ought to weigh 82 grams. The practical result, however, was for the above three cases 49, 56 and 50 grams respectively, thus leaving some mercurous iodide to be accounted for. Two of the obtained powders were of an olive-green colour, almost without a yellowish tinge, and the other was almost black, therefore it was obvious that the product could not be mercurous iodide, but that a decomposition had taken place.

He then treated some of the filtrate with stannous chloride, which produced at first a white precipitate, changing to a greyish colour on further addition, also when sulphuretted hydrogen was passed through some of the solution the characteristic precipitate of mercuric salts was produced; thus this proved the presence of mercury in the filtrate.

Sulphate of copper when added to the solution produced a whitish precipitate of cuprous iodide; this proved the presence of iodide in the filtrate. The same reactions were obtained with the filtrates of the three preparations, therefore the foregoing reactions afford a very good proof that mercurous iodide cannot be made by the double decomposition of iodide of potassium and mercurous chloride.

I noticed in the *Pharmaceutical Journal* for 1868 that Mr. C. H. Wood read a paper on the preparation of mercurous iodide. He tried several methods, but in no case did he obtain a perfectly pure specimen. He stated that in making it from its elements, "if the titration of the mercury and iodine be continued until the powder turned to a dingy yellow colour, it contained much less mercuric iodide and free mercury than that in which the trituration was stopped when it had turned green."

Mercurous iodide is a very easily decomposable substance, not only by light but also by other agents. When heated it yields red crystals of mercurosomercuric iodide HgI,HgI_2, and free mercury. Iodide of potassium decomposes it, producing at first a dark-green coloration, subsequently turning to black, and with slight agitation the precipitate is dissolved, yielding mercuric-potassium iodide $HgKI_3$; chloride of potassium likewise decomposes it, but acts much more slowly than the former. If the solution of chloride of potassium is boiled with the mercurous iodide it acts instantly. It dissolves in solution of hyposulphite of sodium, yielding a colourless liquid, which on heating deposits dark red mercuric sulphide.

After shaking 1 gram of the salt with 10 cubic centimetres of alcohol the filtrate should be scarcely coloured with hydrosulphuric acid; on being dropped into water it should produce only a very faint cloudiness, and on evaporation should leave only a slight residue of mercuric iodide.

I obtained several specimens and estimated the percentage of mercuric iodide contained in them in the following manner. Two gram quantities of each were taken and percolated with ether (the percolate being collected in a weighed beaker), until the whole of the mercuric iodide was removed. The ether was then evaporated off at as low a temperature as possible, and the residue weighed, from which the percentage was easily calculated.

The results were as follows:—

No. 1. This was of a yellowish-red colour; its exact age was not known, but it was a good many years old, and had been preserved in a moderately dark place in a white glass bottle; when submitted to the action of ether it turned a greenish-yellow colour, and contained 4·825 per cent. of mercuric iodide.

No. 2 was procured from a wholesale house; it was of a light yellowish-green colour; how long it had been made I do not know. The ether turned it slightly yellower and it gave the percentage of ·275 of mercuric iodide.

No. 3 was a specimen I prepared myself, according to the process of the British Pharmacopœia of 1867, and after it had been exposed to the action of the light for eight days was estimated. When first made it was of a yellowish-green colour, but after eight days exposure was very much darkened in colour; the ether turned it yellow, and it contained ·075 per cent. of mercuric iodide.

No. 4 was a specimen obtained from a pharmacist; it was nine years old, and had turned quite red; it had been kept in a blue bottle in a dark cupboard; the ether quite changed its colour to light yellow; it contained 10·25 per cent. of mercuric iodide.

No. 5 was a specimen from a pharmaceutical chemist; it had been recently prepared, and was of a dark greenish yellow colour; the ether made it slightly yellower. The percentage of mercuric iodide contained in it was ·0525.

No. 6 was likewise obtained from a pharmaceutical chemist; it was older and of a yellowish green colour, and contained ·05 per cent. of mercuric iodide.

A discussion followed, in which the Chairman, Secretary, Messrs. Braithwaite, Fuge, Woodruff, Ough, and Salter took part.

Mr. J. B. Thornley then read a note on Alums, giving first a definition of what constituted an alum, and then a detailed description of the methods of preparation, appearance, and properties of the various members of this class of salts. The note was illustrated by specimens, and give rise to a discussion, in which the Chairman, Secretary, Messrs. Latchmore, Ough, Fuge, Burridge, and Whitfield joined.

Mr. A. C. Stark then delivered a report on organic chemistry, which included notes on phenacetin, pyrodin, antipyrin and its decomposition products, cod-liver oil, and the following paragraphs on "The Chemistry of Castor Oil" and Quassin.

Chemistry of Castor Oil.—I have here a specimen of ricinoleic acid prepared by the method given in a paper on the composition of castor oil by Herr F. Krafft.* The process is as follows:—Castor oil is saponified by strong KHO, the resulting soap heated for a short time with concentrated HCl, and the separated fatty acids collected and cooled by a freezing mixture, when the ricinoleic acid crystallizes out. The acid melts at 16° to 17° C., and is then a colourless oil. Its composition is represented by the formula—

$$CH_3(CH_2)_5CO(CH_2)_{10}COOH = C_{18}H_{34}O_3,$$

thus differing from oleic acid by possessing another atom of oxygen in the molecule. According to Herr Krafft it does not yield œnanthol when distilled. This statement is opposed to the information given in Fownes's 'Manual.'

The deposit which occurs when castor oil is kept in a cool place (amounting to 3 or 4 per cent.) consists of glycerides of stearic and ricinoleic acids.

On oxidation by HNO_3 it yields normal heptylic acid (œnanthylic acid) and oxalic acid. When the barium salt of ricinoleic acid is heated in a partial vacuum, methyl hexyl ketone $CO\begin{cases}C_6H_{13}\\CH_3\end{cases}$ distils over, and by treating the residual liquid with HCl, ricinic acid $C_{18}H_{34}O_3$ (an isomer of ricinoleic acid) is obtained, crystallizing from alcohol in plates melting at 84°. The liquid fatty acids of castor oil oxidized (by $KMnO_4$) yield trihydroxystearic acid,

$$C_{17}H_{32}(OH)_3COOH,$$

and also isotrihydroxystearic acid, but they do not yield dihydroxystearic acid, thus proving the absence of olein fat:—$C_{17}H_{33}COOH + O_2 = C_{17}H_{33}(OH_2)COOH$. Castor oil is in fact the only drying oil known which contains no olein.

It has been proposed to call trihydroxystearic acid "ricinoleic acid," and the iso acid "ricinosoleic acid."†

These fatty acids have of course nothing to do with the purgative properties of castor oil, and it is remarkable that the principle to which these are due should have remained so long unsatisfactorily settled, the discovery of ricinine being by no means conclusive.

Composition of Quassin.—A series of experiments with a view to determine the composition of quassin have been undertaken by W. Oliviera.‡ Quassin was converted into quassic acid ($C_{30}H_{38}O_{10}$) by heating in a sealed tube at 100°, filtering and precipitating the quassic acid by H_2O; it was then freed from any unaltered quassin by means of cold alcohol, in which quassic acid is insoluble. Quassic acid is a dibasic acid yielding barium salts, and from the behaviour of this acid with reagents the author is led to believe that quassin is an anthraquinone derivative.

* *Berichte*, 21. † *Monatshefte fur Chemie.* ‡ *Gazzetta.*

The report gave rise to a discussion, in which the Chairman, Secretary, Messrs. Salter, Ough, and Thornley took part. After some further discussion on miscellaneous points the meeting adjourned.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of this Association was held at the Hanover Rooms, Argyll Street, W., on Thursday, February 14. The President, Mr. E. J. Millard, in the chair. The first of a series of two lectures on "The Ear as a Musical Perceptive Instrument," was then delivered by H. Macnaughten Jones, Esq., M.D., F.R.C.S.

The lecturer having pointed out the distinction between noise and organized musical sounds, proceeded to describe the anatomical character of the ear with some collateral remarks on its hygiene. The various organs which compose the auditory system were exhibited and described by models and diagrams shown by the limelight. The remarkable fact that the ear has special organs enabling it to differentiate between noise and musical sounds was dwelt upon, and it was shown that provision was made for appreciating the sixty-sixth part of a semitone, whilst highly trained ears could rarely distinguish much more than the one thirty-third part.

The convolution of the brain, where the sense of hearing was found to lie, was pointed out, and some of the reasons for deafness were referred to.

The lecture, which was of an extremely lucid and interesting nature, was delivered to an audience of about two hundred ladies and gentlemen, and gave rise to much applause. At the conclusion a vote of thanks was accorded to the lecturer by acclamation.

Review.

ELEMENTS OF PHARMACY, MATERIA MEDICA AND THERAPEUTICS. By William Whitla, M.D., etc. Fifth Edition.*

Although little more than seven years has elapsed since the appearance of the first edition of Dr. Whitla's manual, it has now reached a fifth edition, and in the process has undergone the experience, apparently unavoidable by text-books, of increasing in bulk some 30 per cent. Such development, however, at the hands of the original author of a book, is not necessarily objectionable, since it probably represents improvements due to wider experience. In this sense Dr. Whitla continues to add fresh touches to his book at every opportunity, and he tells us that in the present edition nearly one hundred pages of entirely new matter have been added, while the section on non-official remedies has been rewritten. Thus the section on pharmacy is improved by the insertion of a list of incompatibilities; and that on materia medica is enlarged by a list of the natural orders of the various official plants and their preparations, extending over fourteen pages. But the most considerable increase occurs in the section on non-official remedies, which contains descriptions of all the principal remedies that have been put forward in recent years. Indeed, it is hardly hypercritical to say that this section is too inclusive, since many substances are described that have hardly been the subject of more than a suggestion, whilst others, after more or less trial, have failed to maintain any place in therapeutics. Hygrinic ether, whatever that may be, anhalonium and oubain, are instances of the first class, and probably kairin, alveloz and antithermin of the latter. "Hopeine," "stenocarpine," and possibly "drumine" never had any right to appear in such a list, and the first two should certainly be omitted. The paragraph relating to "hopeine" especially is incorrect. "Scopoleine" also has been shown to be a mixture of atropine, hyoscyamine and hyoscine, and as the characters of hyoscine are now known, it is not quite clear why only one maker's product is to be used. We notice also that Dr. Whitla persists in treating trimethylamine and propylamine as one and the same compound. Taken as a whole, however, the book admirably fulfils the purpose for which it is intended and fully justifies the success which it has met.

* London: Henry Renshaw. 1889. Fcap. 8vo. Pp. 1-648. 10*s.* 6*d.*

Obituary.

Notice has been received of the death of the following:—

On the 31st of January, Mr. Isaac Taylor, Chemist and Druggist, Clarendon Street, Wakefield. Aged 44 years.

On the 6th of February, Mr. John Daniel, Chemist and Druggist, King Street, Aberdeen. Aged 63 years.

On the 6th of February, Mr. Emanuel Newcombe, Chemist and Druggist, Okehampton. Aged 86 years.

On the 9th of February, Mr. John Hulme, Chemist and Druggist, late of Oldham. Aged 70 years.

On the 10th of February, Mr. Hartley Sagar, Chemist and Druggist, Ventnor, I. W. Aged 39 years. Mr. Sagar was an Associate of the Pharmaceutical Society.

On the 14th of February, Mr. Simon Robinson, Chemist and Druggist, Chester-le-Street. Aged 84 years.

On the 14th of February, at Leamington, Mr. Edward Thornton, Chemist and Druggist, late of Ipswich. Aged 38 years. Mr. Thornton was an Associate of the Pharmaceutical Society.

On the 9th of February, Mr. A. H. Saunders, of the firm of Ayrton and Saunders, Liverpool. Aged 65 years.

Correspondence.

STAMP ACT PROSECUTIONS.

Sir,—Your leader of 16th inst. does not fairly represent the position I took at the meeting in Newcastle, regarding the medicine stamp and the threatened prosecutions in our neighbourhood for infringement of the Act.

You appear to assume several points which are not correct. I was not in any way responsible for the meeting being called, and indeed did not know anything about any prosecutions till I was called upon a day or two before the meeting to know if I would take the chair. My presence there did not imply that I was one of those who had been prosecuted, nor does the fact that I have not been prosecuted prevent me sympathizing with the sufferers, and I do not feel it my duty to stand aloof if any expression of opinion or any account of my experience may be of use to my fellow pharmacists in their troubles.

I cannot be answerable for anything anyone else said at the meeting, but I am quite willing to accept all responsibility for the truth of what I said myself. I am surprised that a man of your wide experience and continual contact with this question should suppose that the publication of the correspondence of Messrs. Macfarlan with the Commissioners of Inland Revenue should have removed all possibility of misunderstanding in the future. That correspondence seemed to indicate that the commissioners *might* consider any medicine liable to stamp duty if the name of a person in the possessive case preceded the name of the medicine. But the new handy book by Mr. Alpe, of the solicitors' department of the Inland Revenue Office, says that Dr. Gregory's Stomachic Powder is not liable, though the originator's name in the possessive case does precede the name of the medicament.

There are a dozen other points on which the law requires clearing up, perhaps the most important of which is to know whether we are bound by the letter of the Acts of Parliament, or by the opinion of the Commissioners of Inland Revenue, but I need not now enlarge upon the obscurities.

You seem to take exception to my statement that chemists are under a continual temptation to avoid the stamp duty by omitting from their labels particulars which would be useful to the patients, and you imply that this statement of fact is inconsistent with the fact that a number of prosecutions have been threatened in the northern counties. But whether you can see it or not both statements are true. I have modified my labels and avoided the necessity of stamping many of my preparations, and some of my neighbours have been threatened with fines.

Your conclusion, "The only alternatives seem to be to comply with the provisions of the Act," is very much the same as the remarks with which I opened the meeting. I incline to the abolition of the Act; but as I do not think that likely to be readily accomplished, I express the desire that the various Acts should be so modified that the chemist reading them with the desire of complying with their provisions should be able to decide what is required of him, and that condition of intelligibility cannot be said to hold so long as you say the use of the possessive case indicates proprietorship, which is by the Act a condition of liability to stamp duty, and a legal authority from the Inland Revenue Office gives us illustrations* of labels where the possessive case is used, and he says they are not liable.

Grey Street, Newcastle. BARNARD S. PROCTOR.

ACONITE ROOT.

Sir,—The important paper by Mr. Squire "On the Proper Time for Collecting Aconite Root," and the interesting discussion which followed, emphasize the serious defects in our present supply of this drug, and at the same time suggest difficulties which will not be easily overcome.

Although it has been supposed that the root of the wild plant, under favourable conditions, possesses more activity than the cultivated, it appears to have been the general opinion of the speakers that cultivation should be resorted to in order to secure more uniformity.

Having had some experience in the cultivation of aconite I should like to suggest what appear to me the most obvious difficulties to be encountered.

In the first place it was mentioned by Mr. Holmes that in a collection of typical specimens sent by Professor Vogl, only one answered to the characters of the true *Aconitum Napellus*.

It is notorious that the plants now cultivated in this country consist largely of hybrids and varieties differing to a greater or less extent from the true type, and it is quite possible that cultivation alone may induce changes which have not yet been fully recognized.

Under these circumstances is it probable, even if some quantities of the typical root be distributed amongst cultivators, that the genuine article would alone appear in the market, especially if the cultivation be placed, as appears to be suggested, in the hands of the ordinary British agriculturist? When a distinguished and disinterested professor fails, it is to be feared that a group of comparatively unlearned husbandmen are hardly likely to succeed in preserving only specimens of a somewhat obscure type.

The cost of production would also seriously handicap the British grown root. To make a remunerative crop, the cultivator would probably require 2*s.* 6*d.* or 3*s.* per lb. for it when dried, whilst the foreign is readily obtainable at less than a quarter of this price.

Doubtless the upper ten in the pharmaceutical ranks would be willing to pay the higher figure, if it were proved that the home-grown drug was the more reliable, but I fear that the average dispensing chemist would require a stronger motive to induce him to pay the greatly advanced price for the root or its preparations.

The best time for collecting the root might vary according to the season. Last autumn the plants which had been cut down in the summer were again grown up and in flower, owing to the mildness of the weather.

A full recognition of the difficulties to be met would suggest the possibility of altogether discarding a root which it is impossible to distinguish by outward appearance from comparatively worthless allied varieties. The root of the Japanese aconite (*Aconitum Fischeri*) is said to be more active than the European species, and appears to be much more easily distinguished. A dependable market for this drug would probably induce constant supplies, and possibly the desired approach to uniformity would be more readily obtained by its use.

Before, however, this or any other point can be definitely settled, a more scientific and accurate method of estimating the value of the drug is essential. Although the application of the sliced root to the tongue may afford some indication of its worth, it will scarcely be maintained that this is a method on which much reliance can be placed. The varying conditions of the root itself, and also of the organ to which it is applied, are surely liable to lead to erroneous conclusions.

Let us hope that the interest and importance of the subject will stimulate research, and that before long we may have at our disposal reliable methods for the estimation of the drug and its preparations.

Hitchin. F. RANSOM.

CASCARA SAGRADA.

Sir,—The paper read by Mr. John Moss at the last Evening Meeting, fully corroborates what Dr. Squibb stated in the *Ephemeris* about the beginning of last year, regarding the cost and scarcity that would arise when a universal demand occurred for cascara.

He (Dr. Squibb) suggested the use of *Rhamnus Frangula* bark as an alternative. This bark is obtained, so to speak, as a by-product, the wood of the branches being collected in large quantities, and carbonized for the manufacture of gunpowder; consequently it can always be obtained of good quality and at a moderate cost.

The reason, I believe, why the *Rhamnus Frangula* bark has not asserted itself may be connected with the fact that in most of the text books on materia medica and therapeutics it is stated that the bark should not be used until it is at least one year old, otherwise it may cause griping. I think that is no reason why it should not come into more general use, since a fluid extract prepared from bark a year old operates more pleasantly than cascara, mixes well with water, and is agreeable to the palate, which is certainly a desideratum.

30, *Union Street, Inverness.* J. MITCHELL.

PARIS QUADRIFOLIA.

Sir,—In reference to Mr. W. Baxter's "Note on an abnormal form of *Paris quadrifolia*," which appeared in your columns on the 26th of last month, it may be interesting to many of your readers to know that I have gathered specimens in the woods around Cardiff, bearing four, five, six and seven leaves. I have in my possession several specimens with four leaves, and one with six, but the other two have been unfortunately mislaid. Should I succeed in finding some of these abnormal forms in the early summer, I shall be pleased to reserve a specimen or two for Mr. Baxter, upon intimation of his wish.

65, *St. Mary Street, Cardiff.* HAROLD H. PROSSER.

Sir,—Mr. Baxter's paper on "An Abnormal form of *Paris quadrifolia*," read before the Chemists' Assistants' Association, appears to have created some misapprehension.

Mr. Baxter did not intend to imply that the normal form of *Paris quadrifolia* had more than four leaves, and in his description of the normal type, that is the number stated. "The other varieties of this plant which sometimes occur . . . those with five leaves the commonest of all," refers solely to the abnormal forms.

As several members who were present at the meeting (including myself) have mistaken the author's statements, I think it but right, as the reporter of the meeting, to offer this explanation.

A. CAMPBELL STARK, Hon. Sec. C.A.A.

103, *Great Russell Street.*

H. Machon.—We do not recollect the publication of the formula.

North Country.—See a formula on p. 670 of the present number.

H. Wilson.—In the absence of any objection, and we have heard of none, we do not think there is any necessity for you to offer an explanation.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Shillinglaw, Cripps, Hurst, Wood, Johnston, Cherry, P. D. A.

* See Alpe's 'Hand Book of Medicine Stamp Duty,' page 74.

BENEVOLENT FUND.

STATEMENT OF RELIEF GRANTED DURING 1888.

ANNUITANTS.

			£	s.	d.	£	s.	d.
40 Annuitants	@ £35 per annum		1400	0	0			
9 do.	@ £30 „		270	0	0			
2 do.	@ £35 „ (one quarter)		17	10	0			
1 Annuitant	@ £35 „ (two quarters)		17	10	0			
						1705	**0**	**0**

Total number of Annuitants during the year ... **52**

TEMPORARY GRANTS.

Amount granted in **42** cases after investigation by the Committee... ...	**395**	**0**	**0**
Total amount of Relief granted during 1888 ...	**£2100**	**0**	**0**

SPECIAL NOTE.—The benefits of the Benevolent Fund were, by the provisions of the Pharmacy Act, 1868, extended to all persons—whether connected with the Pharmaceutical Society or not—whose names appear on the Register of Chemists and Druggists, and to the widows and orphans of such persons.

BENEVOLENT FUND.

LOCAL LIST OF SUBSCRIPTIONS & DONATIONS

RECEIVED DURING 1888.

	£	s.	d.
Aberaman.			
Jones, Morgan J.	0	2	6
Aberdare.			
Jones, D. W.	0	5	0
Smith, Morgan	0	2	6
Aberdeen.			
Coutts, C.	0	5	0
Cowie, G.	0	5	0
Cruickshank, Geo. P.	0	5	0
Davidson, Charles	1	1	0
Giles, William	0	5	0
Glover, W. K.	0	5	0
Gordon, William	0	5	0
Johnston, John	0	5	0
Kay, James P.	0	10	6
Kemp, James	0	5	0
Paterson and Sons	0	10	6
Strachan, Alexander	0	5	0
Aberfeldy.			
Macnaughton, H. B.	1	1	0
Abergavenny.			
Pryer, Henry	0	5	0
Shackleton, G. W.	0	5	0
Abergele.			
Hannah, John	0	2	6
Aberystwith.			
Davies, David J.	0	2	6
Ellis, Robert	0	2	6
Hopkins, W. R.	0	2	6
Thomas, John	0	2	6
Wynne, Edward P.	0	10	6
Abingdon.			
Allen, Herbert	0	2	6
Osborne, Geo. C.	0	5	0
Smith, William	0	5	0
Smith, William F.	0	5	0
Aboyne.			
Petrie, James J.	0	5	0
Accrington.			
Stanley, Thomas	0	2	6
Addiscombe.			
Townsend, Charles	0	10	6
Adelaide (South Australia).			
Harrison, W. H.	0	2	0
Alcester.			
Adcock, H. D.	0	5	0
Adcock, Isaac Dickson	0	10	6
Heath, Josiah W.	0	5	0
Overbury, Henry	0	5	0
Aldershot.			
Williams, James	0	10	6
Alexandria (N.B.).			
McFarlane, Peter	0	5	0
Alford (Lincs).			
Brown, J.	0	2	6
Soulby, Mrs.	0	2	6
Alfreton.			
Evison, Alfred	0	5	0
Robinson, Joseph S.	0	10	6
Alnwick.			
Newbigin, James L.	0	10	6
Newbigin, Lesslie	0	5	0
Alresford.			
Richardson, J. H.	0	2	6
Willis, William	0	5	0
Altrincham.			
Clarke, J. T.	0	5	0
Unsworth, J. W.	0	5	0
Ambleside.			
Herd, Henry W.	0	2	6
Ammanford (Carmarthenshire).			
Evans, Evan	0	10	6
Ampthill.			
Allen, George	1	1	0
Andover.			
Bienvenu, John	0	10	6
Gradidge, W. T.	0	5	0
Angmering.			
Freeland, H. W.	0	2	6
Arbroath.			
Burn, David H.	0	5	0
Naysmith, Andrew	0	5	0
Robertson, John	0	5	0
Shield, Mill and Jack	0	5	0
Ashbourne.			
Bradley, Edwin Sylvester	0	10	6
Greaves, Frederick W.	0	5	0
Osborne, James	0	5	0
Reckless, A. H.	0	10	6
Ashby-de-la-Zouch.			
Bullen, George W.	1	1	0
Ashford (Kent).			
Brothers, John	1	1	0
Forth, W. P.	0	5	0
Ingall, Joseph	1	1	0
Stedman, F. W.	0	5	0
White, Charles Thomas	0	5	0
Ashford (Middlesex).			
Hazledine, Thomas	0	5	0
Ashton-under-Lyne.			
Belfield, William	0	5	0
Bostock, William	0	5	0
Fisher, Edwin	0	5	0
Phillips, J. J.	0	5	0
Thatcher, T.	0	5	0
Waterhouse, Jabez	0	10	6
Atherstone.			
Orme, William	0	10	6
Atherton.			
Fletcher, Ellis	0	5	0
Heywood, John H.	0	5	0
Aylesbury.			
Dickins, Rowland	0	10	6
England, R. A.	0	2	6
Palmer, Edwin T.	0	5	0
Bakewell.			
Carrington, Edward G.	0	5	0
Baldock.			
Bally, Edward F.	0	5	0
Kent, T. W. (Arlesey)	0	5	0
Banbury.			
Ball, George V.	0	10	6
Bartlett, H.	0	5	0
Gilkes, Fredk. G.	0	5	0
Watts, W.	0	5	0
Banchory.			
Lunan, Alexander	0	5	0
Banff.			
Alexander, W.	0	5	0
Bangor.			
Jones, Owen	0	5	0
Webster, Thomas	0	5	0
Barnsley.			
Mitchell, J. S.	0	5	0
Barnstaple.			
Britten, Wm. B.	0	5	0
Goss, Samuel	0	5	0
Partridge, James	0	5	0
Pratt, Edward	0	5	0
Barrow-in-Furness.			
Sansom, E.	0	2	6
Barton-on-Humber.			
Smith, Richard F.	0	5	0
Bath.			
Alcock, Henry	0	5	0
Appleby, E. J.	0	10	6
Boutelle, H.	0	2	6
Capper, Edmund	0	5	0
Clarke, B. G.	0	2	6
Commans, Robert D.	1	1	0
Dunn, Richard	0	10	6
Goodman, D. H.	0	5	0
Griffin, Alfred W.	0	5	0
Hall, Reuben	0	4	0
Hancock and Co.	0	2	6
Hillier, Henry	0	10	6
Hutton, Harry	0	2	6
Loveless, E. W. (Twerton-on-Avon)	0	2	6
Marsh, John H.	0	10	0
Masters, Henry James	0	5	0
Merrikin, John B.	0	10	6
Partington, J. J.	0	5	0
Pinch, James E.	0	10	6
Potts and Co.	0	10	6
Sharp, Benjamin	2	2	0
Snow, A. L.	0	2	6
Thomas, Henry J.	0	10	6
Thring, E. J. H. (Monkton Combe)	0	10	6
Tilsley, George	0	10	6
Toone, Joseph V.	0	10	6
Whiston, E.	0	10	6
Williams, Mrs. Sophia	0	10	6
Wilson, Joseph	0	10	6
Beaumaris.			
Slater, John	1	1	0
Beccles.			
Flower, William	0	5	0
Beckenham (Kent).			
Bright, Frederick	0	5	0
Waring, A. W.	0	5	0
Bedale.			
Pratt, William (West Burton)	0	5	0
Swinbank, J.	0	5	0

Bedford.	£	s.	d.
Anthony and Biss	0	10	0
Cameron, William Alexander	0	5	0
Corrie, A. A.	0	2	6
Corrie, Isabella A.	0	5	0
Ekins, John	0	10	6
Hester, Charles	0	5	0
Mountford, Maurice	0	2	6
Norman, Joseph S.	0	5	0
Taylor, J. B.	0	5	0
Thompson, H.	0	5	0
Bedlington.			
Foggan, George	0	10	6
Belfast.			
Green, Thomas	0	5	0
Yoxall, Henry	0	5	0
Belper.			
Burkinshaw, W. T.	0	5	0
Calvert, James	0	5	0
Berkhamsted.			
Bosher, Alexander	0	2	6
Bexhill.			
Brisley, George	0	5	0
Bexley Heath.			
Mason, Alfred J.	0	5	0
Bexley (Kent).			
Hodder, G. W.	0	5	0
Bicester.			
Bates, John	0	5	0
Sandiland, R. B.	0	10	6
Bideford.			
Griffits, John A.	0	5	0
Hogg, Mrs. Mary	0	5	0
Biggar.			
Eunson, John	0	2	6
Biggleswade.			
Evans, John	0	5	0
Spong, D. M.	0	5	0
Billericay.			
Nix, J. K.	0	10	6
Bilston.			
Gray, Charles	0	5	0
Kearnes, Robert H.	0	5	0
Bingham.			
Doubleday, Frederick	0	5	0
Bingley.			
Skirrow, William E.	0	10	6
Birkenhead.			
Barber, George	0	10	6
Dutton, H. O.	1	1	0
Field, H. E.	0	5	0
Foulkes, William James	1	1	0
Haywood, W. H.	0	5	0
Kemp, W. C.	0	5	0
Knapp, C. R.	0	5	0
Birmingham.			
Adam, Frederick	0	2	6
Barker, Thomas	0	10	6
Bellamy and Wakefield	1	1	0
Bird, Alfred	1	1	0
Brady, B. F.	0	10	6
Brunt, G. H.	0	10	6
Chase, Thomas, jun.	1	1	0
Clayton, Francis Corder	1	1	0
Cornforth, Edwin	0	2	6
Cripps, R. A.	0	10	6
Foster, Alfred H.	0	5	0
Foster, James Alfred	0	5	0
Gaskin, J. H.	0	2	6
Gibson, F.	0	10	6
Mantell, Charles	0	10	6
Mantell, Charles, jun.	0	10	6
Mott, John C.	0	5	0
Naish, C. E.	0	10	6
Page, C.	0	5	0
Pegg, Herbert	1	1	0
Perry, George E.	0	5	0
Perry, William Henry	0	5	0
Prosser, Frank H.	0	10	6
Radford, J. A.	0	2	6
Smith, E.	0	2	6
Southall Bros. and Barclay	1	1	0
Thompson, Charles	0	5	0
Thompson, William	0	5	0
Wilcox, George	0	5	0
Williams, H. E.	0	5	0

Bishop Auckland.	£	s.	d.
Dobinson, Thomas	0	5	0
Harburn, Alfred	0	5	0
Townend, Thomas F.	0	5	0
Bishops Stortford.			
Hardy, John	0	5	0
Speechly, George	0	10	6
Bishop's Castle.			
Bills, Martha Cam	0	10	6
Blackburn.			
Ainsworth, Clayton and Jowett	0	10	6
Butterfield, William	0	5	0
Critchley, T.	0	10	0
Farnworth, William	1	1	0
Garland, A. P.	0	5	0
Harrison, J.	0	2	6
Hindle, James	0	2	6
Hindle, Joseph	0	2	6
Paffard, Frank	0	10	0
Yates, Daniel	0	5	0
Blackpool.			
Jackson, Joseph	0	5	0
Laurie, John	0	5	0
Parkinson, C.	0	10	6
Blagdon.			
Dudden, R. M.	0	5	0
Blandford.			
Groves, Richard H.	1	1	0
Bognor.			
Long, Alfred T.	0	10	6
Bolton.			
Blain, William	0	10	6
Blain, W. R.	0	5	0
Fawthorp, Joah	0	5	0
Forbes, James W.	0	10	6
Hart, James	0	10	6
Mather, James	0	10	6
Phillips, Sidney (Horwich)	0	5	0
Bombay (India).			
Prebble, John G.	0	5	0
Bonnyrigg.			
Hutcheon, W.	0	5	0
Boston (Lincs.).			
Grimble, Albert	0	5	0
Haller, F. W.	0	5	0
Kent, B. J.	0	5	0
Boulogne-sur-Mer.			
Parsons, J. Vincett	0	5	0
Bourne (Lincs.).			
Mills, Robert M.	0	10	6
Bournemouth.			
Amoore, H.	0	2	6
Beale, J. H. T.	0	5	0
Bilson, F. E.	0	5	0
Bridge, G. E.	1	1	0
Dobell, Dr. Horace	1	1	0
Duncan, Alexander	1	1	0
Endle, Frederick	0	10	6
Gilbert, William	0	5	0
Hardwick, Stewart	0	10	6
Haynes, J. A.	0	2	6
Hazard, James D.	0	5	0
Jones, William	0	10	6
Noble, James	0	5	0
Shipman, John J.	0	5	0
Sloan, W. G.	0	7	6
Smith, W.	0	2	6
Spinney, Frank	0	10	6
Taylor, George	0	5	0
Toone, J. A.	0	10	6
Worth, Edwin	1	1	0
Bourton-on-the-Water.			
Miles, George	0	2	6
Bovey Tracey.			
Smith E.	0	10	6
Bowness-on-Windermere.			
Birkett, Charles	0	5	0
Bradford (Lancs.).			
Lambert, Thomas	0	5	0

Bradford (Yorks.).	£	s.	d.
Beanland, Samuel (Great Horton)	0	5	0
Blackburn, Bailey	2	2	0
Butterworth, Albert	0	10	6
Cocker, Justus J.	0	5	0
Harrison, Parkinson and Co.	2	2	0
Houfe, R. W.	0	5	0
Lister, Simeon (Great Horton)	0	10	6
Rogerson, H. G.	1	1	0
Stephenson, Robert	0	5	0
Watts, John	0	10	6
Wilson, Albert	0	5	0
Bradford-on-Avon.			
Cooper, Albert H.	0	10	6
Braintree.			
Row, George C.	0	5	0
Branscombe.			
Cooper, George	0	10	6
Braughing.			
Franklyn, Thomas	0	5	0
Brecon.			
Meredith, John	0	5	0
Morris, J. C. B.	0	5	0
Tudor, W. T.	0	5	0
Brentwood (Essex).			
Guest, George R.	0	5	0
Bridgend.			
Jenkins, D.	0	5	0
Lloyd, John	0	5	0
Bridgnorth.			
Cooper, H. S.	0	2	6
Hughes, Hubert	0	5	0
Bridgwater.			
Basker, J. A.	0	5	0
Woodward, John L. L.	0	5	0
Bridlington.			
Dewing, J. E.	0	5	0
Gatenby, Robert	0	5	0
Wrack, F. G.	0	2	6
Bridlington Quay.			
Dickins, Mary	0	5	0
Jackson, Henry J.	0	5	0
Bridport.			
Beach and Barnicott	1	1	0
Beach, James	0	10	6
Beach, Thomas E.	0	5	0
Brightlingsea.			
Cooper, George B.	0	5	0
Brighton.			
Arnold, J.	0	2	6
Barton, Charles	0	10	6
Barton, Henry	0	10	6
Capell, J. R.	0	2	6
Chambers, Herbert	0	5	0
Chapman, F.	0	10	6
Colby, Mrs. G.	1	1	0
Cox, Arthur H.	1	1	0
Damant, Arthur A.	0	5	0
Edwards, J.	0	5	0
Else, William	0	10	6
Gibson, W. H.	0	5	0
Glaisyer, E.	0	10	6
Glaisyer, Thomas	0	10	6
Guy, Frederick	0	10	6
Gwatkin, James Ross	0	10	6
Hardcastle, S. B.	0	10	6
Harris, E. R.	0	5	0
Hickley, G.	0	10	6
Hornsby, George G.	0	10	6
Jeeves, Thomas	0	10	6
Kemp, John	0	10	6
Leigh, Marshall	1	1	0
Levett, H.	0	5	0
Llewellyn, Peter H.	0	5	0
Metherell, K.	1	1	0
Muston, G. G.	0	5	0
Norton, A. J.	0	2	6
Padwick, John	0	10	6
Parris, T. W.	0	5	0
Perress, J. C.	0	5	0
Robson, Thomas	0	10	6
Salmon, W.	0	10	6
Savage and Son	1	1	0
Smith, Walter Henry	1	1	0
Smithson, J.	0	10	6
Stableforth, J. W.	0	5	0

Brighton—continued.	£	s.	d.
Vizer, Edwin B.	0	10	6
Ward, Charles T. (Southwick)	0	2	6
Watts and Co.	1	1	0
Williamson, J.	0	5	0

Brill (Bucks).

Tottenham and Holmes	0	10	6

Bristol.

Ackerman, Theophilus	0	5	0
Allen, Benjamin	0	10	6
Barton, J. B. (Kingswood)	0	5	0
Bennett, Joseph	0	5	0
Berry, William	0	10	6
Boucher, John	1	1	0
Bramald, F. D.	0	5	0
Butler, Samuel	1	1	0
Cuff, Robert C.	0	5	0
Dibble, J. W.	0	10	6
Freestone, R. H.	0	5	0
Freestone, Thomas M.	0	10	6
Hemmons, John	0	5	0
Hodder, Henry	0	5	0
Howell, H.	0	5	0
Isaac, G. W.	0	10	6
Jeffery, Henry	0	10	6
Jones, William W.	1	1	0
Keen, Benjamin	0	10	6
Latrobe, Henry	0	5	0
Llewellyn, David	0	2	6
Long, John T.	0	10	6
Munk, F. A.	0	5	0
Newman, Robert	0	10	6
Pitchford, William	0	10	6
Pitman, John	1	1	0
Plumley, James G.	0	5	0
Presley, Edward	0	5	0
Schacht, G. F.	1	1	0
Smith, Sidney	0	2	6
Spill, Thomas	0	10	6
Stroud, John	1	1	0
Towerzey, Alexander	0	10	6
Townsend, Charles	1	1	0
Townsend, Henry H.	0	10	6
Troake, R. J.	0	10	6
Turner, George T.	0	10	6
Wade, Thomas T.	0	2	6
Warren, Algernon	1	1	0
Watson, E. M.	1	1	0
Whineray, Edward	0	5	0
White, James W.	0	10	6
Woolliscroft, H.	0	5	0
Wretts, John R.	0	10	6

Briton Ferry.

Olive, W. T.	0	5	0

Bromley (Kent).

Goulden, Herbert	0	5	0
Skinner, Richard	0	10	6

Bromyard.

Jones, Charles	0	5	0

Broughty Ferry.

Fleming, E.	0	5	0
Park, William	0	5	0

Brynmawr.

Evans, Alfred E.	0	5	0
Jones, Alfred M.	0	10	6

Buckfastleigh.

Thompson, G. A.	0	5	0

Buckingham.

Kingerlee, George	1	1	0

Builth Wells.

Jones, Morgan H.	0	2	6

Burgess Hill (Sussex).

Ball, Edwin	0	5	0

Burnham (Bucks).

Heald, Alfred J.	0	10	6

Burnham (Essex).

Ellis, William	0	5	0

Burnham Market.

Spencer, William Henry	0	5	0

Burnley.	£	s.	d.
Barlow, Joseph A.	0	2	6
Cowgill, Brian H.	0	10	6
Evans, Thomas	0	5	0
Francis, Mrs.	0	5	0
Heaton, Martha	0	2	6
Hitchin, Robert	0	5	0
Holden, John	0	5	0
Munn, Robert	0	5	0
Parkinson, I.	0	5	0
Parkinson, William	0	5	0
Walker, Sandford	0	5	0
Wilks, Maurice	0	2	6
Wright, John W.	0	2	6

Burntisland.

Bisset, James	0	2	6

Burslem.

Blackshaw, Thomas	0	10	6
Leicester, Thomas	0	10	6
Oldham, William	0	10	6
Wardle, Thomas	0	2	6

Burton-on-Trent.

Ottey, Thomas	0	5	0
Staley, H.	0	2	6
Street, J. W.	0	2	6
Wright, George	0	10	6

Bury.

Bowker, Ellis	0	10	6
Crompton, Alfred	0	5	0
Crompton, H.	0	10	0

Bury St. Edmunds.

Allen, Henry	0	5	0
Brain, F. S.	0	5	0
Clark, Owen A.	0	5	0
Crassweller, W. E.	0	5	0
Floyd, James	0	5	0
Hardwicke, J. E.	0	5	0
Kirkham, Thomas	0	2	6
Last, A. J.	0	2	6
Portway, John	0	2	6
Summers, Frank	0	5	0
Summers, Thos. D.	0	5	0
Thurston, F.	0	5	0
Youngman, Edward	0	2	6

Buxton (Derbyshire).

Ashton, Charles S.	0	5	0
Thresh, Arthur	0	5	0
Thresh, Dr. John C.	1	1	0
Wright, Robert	0	10	6

Cambridge.

Beall, George	0	5	0
Beall, Samuel S.	0	5	0
Church, H. J.	1	1	0
Cook, H. F.	0	2	6
Deck, Arthur	0	10	6
Field, Ebenezer	0	5	0
Gillett, C.	0	5	0
Ivatt, Albert	0	5	0
Pain, Walter E.	0	5	0
Sturton, Richard	1	1	0
Throssel, John	0	5	0
Turner, Charles	0	5	0
Yeomans, John	0	5	0

Canterbury.

Amos, Daniel	0	10	6
Biggleston, E. R.	0	5	0
Bing, Charles	0	5	0
Bing, Edwin	0	10	6
Harris, F. R.	0	10	6

Cape Town.

Tebb, Henry	1	1	0

Cardiff.

Anthony, David	0	10	6
Buse, John	0	2	6
Clarke, C.	0	2	6
Coleman, Alfred	0	10	6
Coleman, E. J.	0	10	6
Drane, Robert	1	1	0
Duck, W. G.	0	5	0
Furnival, William	0	5	0
Graves, R.	0	5	0
Greaves, John	0	5	0
Hagon, Albert	0	5	0
Harries, D.	0	5	0
Hicks, W. T.	0	5	0
Howell, Thomas	0	5	0
Jones, J. A.	0	5	0
Jones, John T.	0	5	0

Cardiff—continued.	£	s.	d.
Kernick and Son	0	10	6
Lewis, James	0	5	0
Lloyd, David	0	5	0
Mumford, Richard	0	5	0
Munday, John	0	10	6
Phillips, John	0	2	6
Prosser, H. H.	0	2	6
Prust, Richard	0	5	0
Rees, John	0	5	0
Robb, John	0	5	0
Sanders, W. J.	0	5	0
Treharne, F. G.	0	5	0
Walklate, J. T.	0	5	0
Williams, G. W.	0	2	6
Williams, R. E.	0	5	0
Williams, W. A.	0	5	0
Williams, W. J.	0	5	0
Williams, W. Jesse	0	5	0
Williams, Thomas	0	10	6
Yorath, T. B.	0	5	0

Carlisle.

Bell, John	0	5	0
Fisher, Catherine Hodgson	0	5	0
Foster, James	0	5	0
Hallaway, John	0	5	0
Nichol, A.	1	1	0
Parker, Edward J.	0	5	0
Parker, William	0	5	0
Penny, John (Great Broughton)	0	10	6
Robson, John	0	5	0
Thompson, Andrew	0	10	6
Todd, Joe	0	5	0

Carluke.

Hinksman, John	0	5	0

Carmarthen.

Lloyd, Walter	0	5	0

Carnarvon.

Burgess, J.	0	2	6
Francis, James	0	2	6
Jones, David	0	5	0
Jones, John	0	5	0
Lloyd, William	0	5	0
Owen, G. C. R.	0	2	6

Carshalton.

Carter, Francis	0	10	6

Castle Cary.

Moore, Francis S.	1	1	0

Castle Douglas.

Veitch, A.	0	5	0

Chapel Allerton.

Saville, William	0	5	0

Chard.

Churchouse, W. B.	0	5	0

Charlestown-of-Aberlour.

Smith, John	0	2	6

Chatham.

Crofts, Holmes C.	0	10	6
French, Miss E.	0	5	0
Lamb, Thomas C.	0	5	0
Morgan, Alfred W.	0	5	0

Cheddar.

Allen, Samuel	0	5	0

Chelmsford.

Baker and Wright	0	10	6
Metcalfe, Wilson	0	10	6
Tomlinson, James	0	10	6
Warren, F.	0	5	0

Cheltenham.

Balcomb, John	1	1	0
Barron, William	0	10	6
Beetham and Son	1	1	0
Board, Thomas F.	0	5	0
Butcher, Thomas	1	1	0
Clarke, David	0	2	6
Codling, A. J.	0	10	6
Davis, G. A.	0	2	6
Edwards, W. P.	0	2	6
Fletcher and Palmer	1	1	0
Fletcher, John	1	1	0
Hall, L.	0	5	0
Hands, William	0	5	0
Hill, Arthur	0	5	0
James, Joseph	0	2	6

Cheltenham—continued.	£	s.	d.
Jeffrey, Thomas A.	0	10	0
Macdonald, E.	0	5	0
Mansbridge, M. C.	1	1	0
Pattison, Thomas	0	10	6
Perry, H. W.	0	2	6
Power, J. H.	0	5	0
Prockter and Forth	1	1	0
Purnell, Henry A.	0	5	0
Robinson, C. E.	0	5	0
Smith, Nathaniel, and Co.	1	1	0
Smith, William H.	0	5	0
Stewart, James	0	10	6
Thomas, J. A.	0	5	0
Thomas, J. P.	0	5	0
Vinden, F.	0	2	6
Walters, John	0	10	6
Williams, W.	0	5	0
Wood, Frederick	0	10	6
Wyatt, S.	0	2	6
Chertsey.			
Ashton, Frederick William	0	5	0
Boyce, George	0	5	0
Flintan, F. R.	0	5	0
Chesham.			
Winch, E.	0	2	6
Chester.			
Baker, W. H.	0	5	0
Baxter, George	0	10	6
Bowers, James D.	0	5	0
Caldecott, Clement G.	0	5	0
Davidson, W.	0	2	6
Donald, A.	0	2	6
Fletcher, J. F.	0	5	0
Guy, John (Broughton)	0	5	0
Hincks, J. W.	0	5	0
Hodges, W.	0	5	0
Huke, James W.	0	5	0
Mills, John	0	5	0
Prince, B.	0	5	0
Roberts, R. M.	0	5	0
Sanderson, William	0	2	6
Shrubsole, G. W.	0	5	0
Spencer, J. H.	0	5	0
Thomas, J. H.	0	2	6
Wilkinson, C.	0	5	0
Williams, Thomas	0	10	6
Chesterfield.			
Barfoot, J. R. D.	0	5	0
Booth, George	0	10	6
Elliott, Thomas	0	5	0
Furness, Thomas	0	2	6
Greaves, A. W.	0	5	0
Lancaster, Wm. G.	0	5	0
Lowe, A.	0	5	0
Sampson, George	0	5	0
Windle, John T.	0	5	0
Wright, G.	0	5	0
Chester-le-Street.			
Greenwell, Richard Henry	0	5	0
Chew-Magna.			
Milton, Thomas	0	5	0
Chichester.			
Baker and Son	0	10	6
Everard, A. G.	0	2	6
Chippenham.			
Coles, John C.	0	10	6
Turpin, A. B.	0	5	0
Chipping Ongar.			
Ward, David	0	10	6
Chipping Sodbury.			
Jones, Richard	0	10	6
Chislehurst.			
Wing, Lewis	1	1	0
Chorley.			
Hill, William	0	5	0
Oakes, G.	0	2	6
Christchurch.			
Green, John	0	5	0
Chulmleigh.			
Joint, Robert James	0	6	0
Cirencester.			
Griffiths, Waldron	0	10	6
Kinch, Edward	0	10	6
Paternoster, J.	0	5	0
Clacton-on-Sea.			
Mann, William	0	2	6
Claycross.			
Lloyd, Robert	0	10	6
Smith, John	0	5	0
Clevedon.			
Trickey, R. H.	0	5	0
Clun.			
Darroll, William	1	1	0
Cobham.			
Redfern, John	1	1	0
Cockermouth.			
Bowerbank, Joseph	1	1	0
Brown, R. F.	0	5	0
Cooper Brothers	0	2	6
Robinson, William	0	5	0
Straughton, Joseph	0	2	6
Codnor (near Derby).			
Farnsworth, Thomas	0	5	0
Colchester.			
Barritt and Son	0	10	6
Bates, Thomas W.	0	5	0
Clover, E.	1	1	0
Cordley, W. B.	0	5	0
Davies, Rees	0	5	0
Everitt, W. E.	0	5	0
Hammerton, Edward	0	5	0
Prosser, Mrs.	0	5	0
Shenstone, J. C.	0	5	0
Simpson, Hales	0	5	0
Weddell, Arthur	0	5	0
Coldstream, N.B.			
Elliott, W. M.	0	5	0
Collumpton (Devon).			
Foster, J.	0	5	0
Foster, M. T.	0	2	6
Coningsby.			
Brown, Leonard H.	0	2	6
Cartwright, Mrs.	0	2	6
Fox, John	0	2	6
Heathcotte, Miss	0	2	6
Wright, Mrs.	0	2	6
Connah's Quay.			
Jones, Kendrick L.	0	2	6
Constantinople.			
Batema , J. M.	1	0	0
Cork.			
Selkirk, James	0	10	6
Corwen.			
Jones, William	0	10	6
Coventry.			
Axford, J. W.	0	5	0
Bird, Frederick	0	5	0
Brown, John	0	5	0
Clarke, William	0	2	6
Glover, Henry	0	2	6
Hinds, James	0	10	6
Jelly, George William	0	5	9
Loveitt, Mrs.	0	2	6
Mason, D.	0	2	6
Miner, M. T.	0	2	6
Morris, John	0	2	6
Newton, Alfred H.	0	2	6
Sellors, Thomas	0	2	6
Spencer Charles	0	2	6
Thompson, A. L.	0	2	6
Wyleys and Co.	1	1	0
Cowbridge.			
Thomas, John	0	5	0
Cowes (Isle of Wight).			
Beaven, George A.	0	10	6
Fennings, Alfred	1	1	0
ditto (donation)	5	5	0
Cranbrook.			
Turner, John	0	5	0
Crawley.			
Leach, John	0	5	0
Webb, W. J.	0	5	0
Weedon, Joseph	0	5	0
Crediton.			
Jackson and Sons	1	1	0
Crewe.			
Bayley, William	0	10	6
Harrop, Wm. H.	0	5	0
Crewkerne.			
Catford, O. W.	0	5	0
Criccieth.			
Bowen, Joseph W.	0	2	6
Cromer.			
Hoare, W. P.	0	5	0
Croydon.			
Barritt, George	0	10	6
Chapman, J.	0	2	6
Clarke, Josiah	1	1	0
Culverwell, John S.	0	5	0
Dixon, W. R.	0	5	0
Faraday, George	0	2	6
Grimwade, E. H.	0	10	6
Harwood, Charles	0	5	0
Lloyd, John	0	5	0
Long, Henry	0	10	6
Noak, W. F.	0	2	6
Padwick, W. G.	0	5	0
Peek, F. W.	0	10	6
Roberts, D. P.	0	10	6
Cullen (N.B.).			
Buchanan, John	0	2	6
Seivwright, George	0	10	6
Dalton-in-Furness.			
Preston, William L.	0	5	
Darlington.			
Cranston, John	0	5	0
Hudson, T.	0	2	6
Nicholson, Richard	0	5	0
Raw, James H.	0	5	0
Robinson, James	0	5	0
Swenden, James	0	10	6
Walton, Frederick G.	0	2	6
Dartford.			
Cann, James	0	2	6
Horrell, A. E.	0	5	0
Horrell, W. H. D.	0	2	6
Wilson, R. E.	0	5	0
Dartmouth.			
Hadfield, H. M.	0	5	0
Humphrey, Horatio	1	1	0
Rees, Colin A.	0	5	0
Rees, William H.	0	10	0
Daventry.			
Harrison, Alfred	0	5	0
Deal.			
Dunn, George S.	0	5	0
Fitt, F. E.	0	10	6
Green, John	0	10	6
Denton (Lancs.).			
Arrandale, William	0	10	6
Derby.			
Ashley, William	0	5	0
Blunt, Walter B.	0	2	6
Clifton, Frederick	0	5	0
Cope, J. A.	0	10	6
Frost, George	0	10	6
Hefford, Charles	0	2	6
Hughes, John S.	0	2	6
Machon, Edward	0	5	0
Monkhouse, Henry	0	5	0
Nicklinson, Thomas	0	5	0
Ordish, Thomas	0	2	6
Scholes, J. S.	0	5	0
Sherwin, Samuel	0	2	6
Stevenson, Richard W.	0	5	0
Wilson, Joseph	0	5	0
Devizes.			
Cripps, E. H.	0	2	6
Edwards, T. R.	0	2	6
Devonport.			
Breeze, A. D.	0	2	6
Breeze, George	0	5	0
Codd, Francis	0	5	0
Lamble, John A.	0	2	6
Rendle, R. H.	0	5	0

Didsbury.	£	s.	d.
Bates, John F.	0	5	0
Richardson, Allen	0	5	0
Diss.			
Cupiss, Mrs. E.	0	10	6
Gostling, T. P.	0	10	6
Thrower, Edward A.	0	10	6
Whitrod, H. F.	0	5	0
Doncaster.			
Atkinson, Stephen (Arksey)	0	10	6
Bonnett, F.	0	2	6
Connor, Thomas H.	1	1	0
Hasselby, T. J.	0	5	0
Howorth, James	0	10	6
Jaques, George	0	10	0
Parkin, Charles	0	5	0
Robinson, T.	0	2	6
Spyvee, W.	0	2	6
Stiles, M. H.	0	10	6
Dorchester.			
Durden, H.	0	5	0
Pearce, William L.	0	5	0
Dorking.			
Doubleday, F. W.	0	10	6
Price, B. W.	0	10	6
Douglas (Isle of Man).			
Aspell, J. S.	0	2	6
Bowman, E J.	0	10	6
Brearey, A. W.	1	1	0
Gore, J. R. A.	0	5	0
Greensill, T. S.	1	1	0
Halton, W.	0	2	6
Radcliffe, J. C.	0	5	0
Richardson, J. W.	0	5	0
Wilson, I.	0	2	6
Young, John	0	5	0
Dover.			
Adams, R. W.	0	5	0
Barnes, William James	0	5	0
Bolton, J.	0	5	0
Bottle, Alexander	1	1	0
Brown, Joseph Fred.	1	1	0
Clarke, Herbert	0	5	0
Dickeson, Sir Richard	1	1	0
Ewell, Richard M.	0	5	0
Forster, Robert Henry	0	10	6
Ham rook, E. O.	0	5	0
Hambrook, John Barber	0	5	0
Leigh, H. M.	0	2	6
Peake, Henry	1	1	0
Stevens, E. W.	0	5	0
Thompson, Edward	0	10	6
Wyles, William	1	1	0
Driffield.			
Bordass, James	0	5	0
Parkinson, Thomas	0	5	0
Dublin.			
Bayley, R.	0	5	0
Bowles, Charles A.	0	10	6
Dudley.			
Thompson, John W. (Sedgeley)	0	10	6
Dufftown (N.B.).			
Sangster, William	0	5	0
Dumbarton.			
Babtie, John	0	5	0
Campbell, Colin	0	5	0
Dumfries.			
Allan, William	0	5	0
Dickson, J.	0	5	0
Dundee.			
Hardie, James	0	10	6
Hardie. James M.	0	10	6
McMillan, James	0	10	6
Dunfermline.			
Fisher, J. H.	0	5	0
Gilmour, David	0	5	0
Seath, Alexander	0	10	6
Tocher, J.	0	5	0
Dunkeld.			
McDonald, Kenneth	0	10	0
Dunse.			
Veitch, James	0	10	6
Dunstable.			
Flemons, Joseph	0	5	0

Durham.	£	s.	d.
Bowman, S.	0	2	6
Burdon, John	1	1	0
Leighton, Mrs.	0	10	6
Longbotham, Joseph (Sacriston)	0	5	0
Palmer, John G.	0	2	6
Rollin, John G.	0	10	6
Sarsfield, John	0	2	6
Sarsfield, William	0	10	6
Scawin and Burn	0	10	6
Wise, Joseph N.	0	5	0
Ealing.			
Curtis, Fred. G.	0	10	0
Hayles Brothers	1	1	0
Jacks, D. K.	0	5	0
Phillips, J. E.	0	10	6
Thomas, Richard	0	10	6
Earlstown.			
Peake, Arthur	0	5	0
Eastbourne.			
Andrews, H. T.	0	10	6
Andrews, J. F.	0	10	6
Bailey, E. G.	0	5	0
Bayley, E. G.	0	5	0
Brown, Henry R.	1	1	0
Crook, Herbert	1	1	0
D'Alton, W.	0	2	6
Earnshaw, B. K.	0	10	6
Gibbs, Joseph	1	1	0
Greenhill, S. O.	0	5	0
Hall, Samuel	1	1	0
Neve, Miss Mary E. B.	0	5	0
Price, W.	0	5	0
Routly, J.	0	2	6
Senior, J.	0	5	0
Wilkes, T. J.	0	2	6
East Dereham.			
Peck, Edward	0	10	6
East Grinstead.			
Dixon, W. H.	0	2	6
Martin, H. S.	0	5	0
Tully, John	0	2	6
East Los Hugeles (S. California).			
Kay, John	0	5	0
East Molesey.			
Kent, F. W.	0	2	6
Parrott, John	0	10	6
Eccleshall.			
Smith, Edgar R.	0	10	6
Edinburgh.			
Ainslie, Wm. W.	0	2	6
Aitken, James	0	5	0
Aitken, William	0	5	0
Arthur, Charles	0	5	0
Baildon, H. C. and Son	1	1	0
Baker, W. C.	0	5	0
Boa, Peter	0	5	0
Bowman, Edmund	0	2	6
Brindle, E.	0	2	6
Brown, Robert S.	0	5	0
Bruce, Alexander G.	0	5	0
Buchanan, James	1	1	0
Burley, William	0	5	0
Center, J. A.	0	2	6
Chemists' Assistants and Apprentices' Association	1	1	0
Clark, Andrew	0	5	0
Clark, Dr. William Inglis	0	10	6
Coats, J. T.	0	5	0
Dewar, F. L.	0	5	0
Dick, Robert	1	1	0
Dott, David B.	0	10	6
Duncan, William	0	5	0
Ewing, James L.	0	10	6
Forret, John A.	0	5	0
Fraser, Alexander	0	5	0
Fraser, J. I.	0	5	0
Gamley, David	0	5	0
Gardner and Ainslie	1	1	0
Gardner, W.	0	5	0
Gibson, Adam	0	10	6
Gilmour, William	1	1	0
Gorrie, Daniel	0	5	0
Grant, J. M.	0	5	0
Hannay, L. W. C.	0	10	6
Hendry, R. L.	0	5	0
Henry, C. F.	0	5	0
Heron, James	1	1	0
Hill, John R.	0	5	0
Hutchinson, M. H.	0	5	0
Keith, Sydney	0	5	0

Edinburgh—continued.	£	s.	d.
Lawrie, J. M.	0	5	0
Lockerbie, James	0	5	0
MacAlley, Robert	0	5	0
MacCallum, A. J.	0	2	6
Macdonald, D. F.	0	2	6
Macdonald, John	0	5	0
Macfarlan and Co.	2	2	0
McGibbon, G. L.	0	5	0
McGlashan, J.	0	5	0
Mackenzie, James	0	10	6
MacLaren, David	0	7	6
Macnair, R. H.	0	2	6
McPherson, Colin A.	0	5	0
Mitchell, W. K.	0	2	6
Morison, John	0	10	6
Noble, Alexander	1	1	0
Pinkerton, William	0	10	6
Pottage, J. C.	0	10	6
Prentice, John	0	5	0
Purves, Samuel	0	5	0
Raimes and Co.	2	2	0
Robertson, G.	0	5	0
Robertson, John	0	5	0
Robertson, James and Co.	1	1	0
Scobie, James	0	5	0
Scott, James	0	10	6
Sharpe, W. C.	0	5	0
Skinner, D.	0	5	0
Smith, T. H. and Co. (donation)	5	5	0
Smith, Thomas	1	1	0
Smith, William	0	5	0
Spence, William	0	5	0
Stephenson, J. B.	1	1	0
Stewart, A. K.	0	5	0
Stoddart, T. G.	1	1	0
Symington, Thomas	0	10	6
Taylor, W.	0	2	6
Thomson, Isaac W.	0	5	0
Thomson, Robert	0	5	0
Wylie, David N.	0	5	0
Egham.			
Bartholomew, William	0	10	6
Elgin.			
Robertson, William	0	5	0
Ely.			
Ellis, H. A.	0	2	6
Gulliver, G. E.	0	5	0
Lincoln, William	0	10	6
Enfield.			
Dymond, T. S.	0	5	0
Gange, George	0	5	0
Epping.			
Rowland, Thos.	0	10	6
Rowland, T. W.	0	5	0
Epsom.			
Oxley, Frederic	0	5	0
Tottle, Henry John	0	5	0
Evesham.			
Dingley, R. L.	0	5	0
Pumphrey, J. H.	0	5	0
Exeter.			
Bard, Jane	0	2	6
Bartlett, John	0	5	0
Botting, Charles	0	5	0
Broom, W. W.	0	5	0
Bulley, William H.	0	2	6
Fouraker, Thomas E.	0	5	0
Gadd, Henry	0	10	0
Lake, John H.	1	1	0
Lemmon, Eric	0	5	0
Milton, Thomas C.	0	10	6
Napier, George L.	0	5	0
Newbury, Frank	0	5	0
Pasmore, George	0	5	0
Sanders, W. F.	0	2	6
Stocker, George	0	10	6
Tighe, Henry W.	0	10	6
Wearing, W. H.	0	5	0
Wright, Robert F.	0	5	0
Eye.			
Bishop, Robert	0	10	6
Eynsham.			
Howe, Henry A.	0	5	0
Falkirk.			
Lyon, Thomas	0	5	0
Murdoch, David	0	10	6
Falmouth.			
Newman, Walter F.	0	5	0
Solomon, W. H.	0	10	6

Fareham.	£	s.	d.
Batchelor, Alfred E.	0	5	0
Batchelor, Charles	0	5	0
Franklin, Alfred	0	10	6
Faringdon.			
Ballard, Arthur	0	10	6
Farnham.			
Cullingford, L. J.	1	1	0
Griffith, J.	0	10	6
Felixstowe.			
Squirrell, Miss Kate	1	1	0
Fenton.			
Massey, Stephen	0	5	0
Weston, Joseph	0	2	6
Ferry Hill.			
Hunter, H.	0	2	6
Flint.			
Jones, O. W.	0	5	0
Folkestone.			
Bishop, E. J.	0	10	6
Goodliffe, George	0	10	6
Lea, Frederick J.	0	5	0
Lea, John	0	10	6
Stainer, John	0	10	6
Folkingham.			
Carter, Mrs.	0	2	6
Kynaston, A. E.	0	2	6
Fordingbridge.			
Haydon, Frederick W.	0	5	0
Forfar.			
Fowler, G. R.	0	5	0
Ranken, James A.	0	5	0
Ranken, John	0	5	0
Forres (N.B.).			
Mackessack, Mrs. T.	0	10	6
Fortune's Well.			
Grant, Donald	0	5	0
Foulsham.			
Maddison, Mary	0	5	0
Fraserburgh.			
Burnett, Robert	0	5	0
Fulletby (Lincs.).			
Elsey, W.	0	2	6
Gainsborough.			
Forrest, Richard Wm.	0	10	6
Galashiels.			
Ross, W.	0	5	0
Garstang.			
Thomas, J. J.	0	5	0
Gateshead-on-Tyne.			
Elliott, Robert	0	10	6
Greenwell, William C.	0	5	0
Glasgow.			
Brodie, Robert	0	5	0
Clarke, Joseph A.	0	5	0
Currie, John (Eglinton Street)	0	5	0
Currie, John (Sauchiehall Street)	0	5	0
Currie, W. L.	0	5	0
Dickie, James	0	5	0
Duncan, J.	0	10	6
Dunlop, Thomas	0	5	0
Fenwick, John	0	5	0
Foster, John	0	10	6
Frazer, Daniel	1	1	0
Glasgow Apothecaries' Co.	1	1	0
Glen, Robert	0	5	0
Harrower, Peter	0	5	0
Henderson, John	0	5	0
Jaap, John	0	10	6
Kinninmont, Alexander	1	1	0
Lambie, Hugh	0	5	0
Lawrence, John	0	10	6
McMillan, John	1	1	0
Neil, J.	0	5	0
Paterson, A.	0	5	0
Peacock, John R.	0	5	0
Rose, Alexander	0	10	6
Thomson, William	0	5	0
Wallace, William	0	10	6
Whitelaw, James	1	1	0

Gloucester.	£	s.	d.
Foulkes, W. H.	0	10	6
Franklin, James	0	5	0
Heynes, Thomas E.	0	5	0
Hughes, Evan G.	0	5	0
Jenkins, Henry	0	5	0
Meadows, Henry	0	10	6
Sadleir, John	0	10	6
Stafford, William	0	10	6
Trigg, James W.	0	5	0
Ward, Joseph	0	10	6
Godalming.			
Barnes, E.	0	10	6
Mather, J. H.	0	10	6
Gorton.			
Plant, Frank G. L.	0	5	0
Gosforth.			
Gaitskell, James	0	5	0
Gosport.			
French, Benjamin	0	5	0
Hunter, John	0	5	0
Smith, W. B.	0	5	0
Govan.			
Skinner, John	0	5	0
Grantham.			
Bishop, William	0	2	6
Fisher, F. D.	0	5	0
Gamble, Arthur	0	5	0
Hall, R. Arnold	0	10	6
Hunt, Thomas	0	5	0
Stewart, James	0	2	6
Welborn, George	0	2	6
Whysall, William	0	10	6
Grantown (N.B.).			
Duncan, William	0	5	0
Gravesend.			
Clarke, Richard F.	1	6	0
Dunn, George M.	0	2	6
Reid, C. Stuart	0	2	6
Wiseman, E.	0	2	6
Grays (Essex).			
Kirby, Samuel John	0	5	0
Great Bedwyn.			
Gerard, George R.	0	10	6
Great Grimsby.			
Barker, William	0	5	0
Cook, Robert, jun.	0	5	0
Mason, William D.	0	2	6
North, S. J.	0	5	0
Robinson, Jonathan Scott	0	2	6
Willey, W.	0	5	0
Guernsey.			
Nicholls, J. B.	0	5	0
Guildford.			
Bingley, F.	0	10	6
Jefferies, Henry	1	1	0
Martin, Edward W.	0	10	6
Thompson, Thomas	0	5	0
Wheeler, Frederick	0	5	0
Guisborough.			
Fairburn, Robert W.	0	5	0
Haddington.			
Gardiner, D.	0	5	0
Watt, James	0	5	0
Hadleigh (Suffolk).			
Wright, E.	0	5	0
Halesworth.			
Gostling, John H.	0	5	0
Halifax.			
Brook, Robert	0	10	6
Dyer, William	0	5	0
Jessop, Jonathan	0	5	0
Seely, H. W.	0	2	6
Swire, Jabez	0	5	0
Halstead.			
Marlar, John F.	0	2	6
Hanley.			
Cornwell, T. C.	0	5	0
Eardley, James F.	0	5	0
Furnival, John D.	0	5	0
Hassall, S.	0	5	0
Jones, Edmund	0	5	0

Hanley—continued.	£	s.	d.
Moore, John William	0	5	0
Scarlett, William	0	5	0
Waldron, J. H.	0	5	0
Hanwell.			
Kirkham, Frank	0	2	6
Harleston.			
Woods, Charles	0	5	0
Harrogate.			
Baker, Sidney G.	0	2	6
Davis, Richard H.	0	10	6
Greenwood, Charles	0	10	6
Greenwood, John	0	10	6
Hodgson, T. S.	0	5	0
Potter, Charles	0	5	0
Pullan, John R.	0	10	6
Reynolds, Freshfield	0	10	6
Wilson and Son	1	1	0
Wood, A. W.	0	5	0
Hartlepool.			
Jackson, William George	1	1	0
Harwich.			
Bevan, Charles	0	10	6
Harding, Joseph	0	10	6
Worts, Augustine	0	5	0
Haslingden.			
Blayney, Joseph J.	0	5	0
Whitlamsmith, W.	0	5	0
Hastings and St. Leonards.			
Bathe, R. S.	0	10	6
Beck, Albert N.	0	5	0
Bolton, Thomas	0	5	0
Brooker, Algernon	0	5	0
Brooks, Frederick	0	5	0
Feaver, John	0	10	6
Jameson, W. E.	1	1	0
Jenner, H. A.	0	5	0
Keyworth G. A.	0	10	0
Maggs, F. W.	0	5	0
Maggs, Samuel B.	0	10	6
Neve, Francis C.	1	1	0
Richards, J. G.	1	1	0
Rossiter, Frederick	0	10	6
Snowdon, Robert	0	5	0
Tharle, C. A.	0	5	0
Tree, Frederick	0	2	6
Haverfordwest.			
Jenkins, Jabez (Lysyfrân)	0	5	0
Saunders, Charles P.	0	5	0
Saunders, David P.	0	10	6
Hawick.			
Craig, John	0	5	0
Kennedy, D.	0	10	0
Maben, Thomas	1	1	0
Turnbull, W. S.	0	2	6
Hay.			
Davies, John Lutwyche	0	5	0
Heaton Chapel.			
Thorp, John	1	1	0
Hebden Bridge.			
Hey, David	0	10	6
Hey, Thomas K.	0	10	6
Heckington.			
Sumners, Michael Cole	0	5	0
Heckmondwike.			
Booth, John	1	1	0
Stead, Walter	0	5	0
Helensburgh.			
Harvie, George	0	5	0
McMurray, J.	0	5	0
Smith, Walter	0	5	0
Helmsdale.			
Fraser, John	0	2	6
Helmsley.			
Allenby, W.	0	10	6
Helston.			
Wakeham, Charles	0	5	0
Hemel Hempstead.			
Argue, James	0	5	0
Hemingby (Lincs.).			
Elsey, —	0	5	0
Elsey, Jessie	0	2	6

Henley-on-Thames.	£	s.	d.
Batchelor, C. J. H.	0	5	0
Hereford.			
Guy, E.	0	5	0
Haines, W. E.	0	5	0
Jackson, J. J.	0	10	6
Pearmund, H. S.	0	5	0
Walker, John	0	10	6
Williams, W. and H. B.	0	10	6
Hertford.			
Durrant, G. R.	0	10	0
Hexham.			
Gibson, J. P.	1	1	0
Richardson, George	0	5	0
Riddle, W. R.	0	5	0
Heywood.			
Beckett, William	0	10	6
Highworth (Wilts).			
Ballard, Edwin	0	5	0
Hinckley.			
Widdowson, G. W.	0	2	6
Hitchin.			
Perks and Llewellyn	1	1	0
Ransom and Son	1	1	0
Hong Kong (China).			
Crow, W. E.	1	1	0
Watson, W. M.	0	5	0
Woolnough, H. A.	0	10	6
Honley.			
Broadbent, John B.	0	10	6
Horncastle.			
Betts, William	0	5	0
Carlton, E. P.	0	10	0
Horndean.			
Bettsworth, Henry T.	0	5	0
Horsforth.			
Wynn, Frederick	0	5	0
Houghton le Spring.			
Rowell, R. H.	0	5	0
Scott, W.	0	5	0
Howden (Yorks.).			
Loain, J. G.	0	5	0
Huddersfield.			
King, William	0	10	6
Wheatley, Charles	0	10	0
Hull.			
Allison, E. and H.	1	1	0
Bell, Charles B.	1	1	0
Bousfield, W. M.	0	5	0
Campbell, Charles	0	5	0
Chapman, E. J.	0	5	0
Chapman, Joseph	0	2	6
Creasser, Matthew	0	5	0
Desforge, J. H.	0	5	0
Dobson, J. B.	0	5	0
Dolling, Alfred	0	5	0
Dyson, George	0	5	0
Gibson, C. P. (Trustees of)	0	5	0
Gregory, Mrs.	0	2	6
Grindell, John	0	10	6
Hall, Henry R. F.	0	5	0
Hammond, William H.	0	5	0
Hart, George William	0	10	6
Hebblethwaite, G. A.	0	2	6
Hollingsworth, James	0	5	0
Hoyles, George	0	2	6
Kenny, Thomas	0	5	0
Linford, John S.	1	1	0
Lofthouse and Saltmer	1	1	0
Oldham, James	0	5	0
Parsons, H. J.	0	2	6
Raynor, A.	0	5	0
Shaw, Ward	0	5	0
Sheffield. A. J.	0	5	0
Souter, Jas. S.	0	10	6
Staning, Walter	0	5	0
Stoakes, Benjamin M.	0	5	0
Hunstanton.			
Twiss, Wm.	0	10	6
Huntingdon.			
Baxter, Robert	0	10	6
Cooper, A.	0	2	6
Huntly (N.B.).			
Chalmers, G.	0	2	6

Hurstpierpoint.	£	s.	d.
Hudson, Alfred W.	0	2	6
Hyde.			
Oldfield, Henry	0	10	6
Hyères (France).			
Powell, Walter A.	0	5	0
Hythe.			
Lemmon, R. A.	1	1	0
Ilford.			
Beal, E. J.	1	1	0
Ilfracombe.			
Crang, Walter	0	10	6
Wheeler, James	0	5	0
Ilkeston.			
Potts, Charles	1	1	0
Ilkley.			
Worfolk, G. W.	0	10	6
Ingatestone.			
Stuart, Henry James	0	5	0
Inverness.			
Bethune, W. J.	0	2	6
Fraser, John	0	5	0
Galloway and Son	0	10	6
Galloway, G. R.	0	10	6
Mitchell, H.	0	5	0
Ipswich.			
Anness, Samuel R.	0	10	6
Chapman and Pain	1	1	0
Clifton, E. S.	0	5	0
Cornell, William	1	1	0
Cossey, James D.	0	10	6
Crassweller, W. E.	0	5	0
Eyre, H. R.	0	5	0
Grimwade, Ridley and Co.	0	10	6
Matcham, Edward	0	5	0
Miller, T. T.	0	5	0
Nunn, C. G.	0	5	0
Spurgeon, Fredk. J.	0	5	0
Wiggin, J. C.	0	10	6
Younger, Robert E.	0	5	0
Irvine.			
Gillespie, James	0	5	0
Isleworth.			
Reece, James	0	5	0
Jarrow-on-Tyne.			
Hooper, Richard	0	2	6
Jedburgh.			
Walker, A.	0	5	0
Jersey.			
Baker, John T.	0	5	0
Cole, George	1	1	0
Ereaut, George	1	1	0
Ereaut, John	1	1	0
Millais, Mrs.	1	1	0
Miller, Henry	0	5	0
Poingdestre, C. R.	0	10	6
Keighley.			
Kershaw, A. N.	1	1	0
Midgley, Walter	0	5	0
Keith.			
Pirie, J.	0	5	0
Kelso.			
Maxton, William Murray	0	5	0
Kendal.			
Bateson, Thomas	0	10	6
Burton, Matthew	1	1	0
Hind, Thomas W. L.	1	1	0
Rigg, G. F.	0	10	6
Severs, Joseph	0	10	6
Kenilworth.			
Barton, Henry Emlyn	0	10	6
Keswick.			
Townley, Thomas W.	0	10	6
Kettering.			
Denston, J. T.	0	5	0
Thursfield, John F.	0	5	0
Kew.			
Edwards, J. E.	0	10	6
Kidsgrove.			
Griffiths, Edwin H.	0	10	6

Kilmarnock.	£	s.	d.
Borland, John	1	1	0
Borland, John, jun.	0	10	6
Kimberley (South Africa).			
Helmore, W. H.	0	5	0
Kimbolton.			
Gudgen, G. B.	0	5	0
King's Lynn.			
Atmore, George	0	5	0
Cocher, John A.	0	5	0
Count, Sidney	0	5	0
Kingston-on-Thames.			
Bond, C. R.	0	10	6
Brewster, William	0	10	6
Higgs, Alfred	0	5	0
Walmsley, Samuel	0	5	0
Whaley, Edward	0	10	6
Kirkcaldy.			
Storrar, David	0	10	6
Knaresborough.			
Lawrence, W. P.	0	5	0
Thompson, George	0	10	6
Knutsford.			
Silvester, Henry T.	0	5	0
Lancaster.			
Arkle, William	0	5	0
Briggs, W.	0	5	0
Fell, James J.	0	5	0
Troughton, Henry	0	5	0
Vince, James	0	5	0
Landport.			
Gall, Frederic	0	2	6
Perfect, George	0	5	0
Langholm.			
Beattie, Thomas	0	5	0
Largs (N.B.).			
Barr, Bryce	0	5	0
Launceston.			
Downing, Frederick	0	5	0
Love, Charles	0	10	6
Wise, William	0	5	0
Leamington.			
Barnitt, John	0	10	6
Barrett, Josephus T.	1	1	0
Davis, Benjamin	0	5	0
Eynon, D. J.	0	10	6
Gibbs, S.	0	5	0
Holloway, E. A.	0	2	6
Norman, William F.	0	5	0
Pullin, William H.	1	1	0
Robinson, J. J.	0	5	0
Sansom, Henry	0	2	6
Smith, Samuel A.	1	1	0
Smith, Samuel H.	0	10	6
Spilsbury, James	0	5	0
Stanley, Herbert	0	10	6
Wells, A. J.	0	5	0
Ledbury.			
Freeman, Ernest	0	10	6
Leeds.			
Abbott, James	1	1	0
Archer, Joseph S.	0	2	6
Beacock, J. H.	0	5	0
Bilbrough, A.	1	1	0
Branson, F. W.	0	10	6
Briggs, George	0	5	0
Brown, Edward	0	10	6
Brown, E. O.	0	5	0
Cole, E. H.	1	1	0
Exley, George	0	5	0
Fawthorp, James	0	5	0
Fourness and Son	0	10	6
Goodall, Backhouse and Co.	2	2	0
Greasley, M. F.	0	10	6
Hardcastle, John	0	5	0
Harvey, William (Headingley)	1	1	0
Hirst, Brooke and Hirst	2	2	0
Hirst, David	0	5	0
Holmes, Francis	0	5	0
Holmes, Joseph	0	10	6
Horsfield, E.	0	5	0
Jefferson, P.	0	5	0
Jones, C. A.	0	2	6
Payne, E. S.	0	5	0
Reynolds, Richard	1	1	0
Reynolds, Richard F.	0	5	0
Robinson, W.	0	5	0

Leeds—continued.	£	s.	d.
Schoon, G.	0	1	0
Smeeton, William	0	10	6
Taylor and Fletcher	1	1	0
Taylor, Samuel	1	1	0
Leek.			
Blades, Josiah B.	0	2	6
Johnson, William	0	5	0
Leicester.			
Berridge, Alfred	0	5	0
Broof, R.	0	10	6
Burford, S. F.	0	10	6
Butler, E. H.	0	5	0
Butler, J. A.	0	5	0
Butler, T. E.	0	5	0
Cadoux, S. H.	0	5	0
Carr, William	0	10	6
Clark, E. A.	0	5	0
Clark, John W.	2	2	0
Clark, Walter B.	0	10	6
Cleaver, Samuel	0	5	0
Cox, S. G.	0	10	6
Ellis, George	0	5	0
Esam, Richard	0	10	6
Freeland, A. J. (Kibworth)	0	2	6
Garrett, John	0	5	0
Harvey, William R.	1	1	0
Lloyd, T. H.	1	1	0
Pickering, Henry	0	5	0
Rowe, W.	0	5	0
Sharp, Edward K.	0	5	0
Wand, Stephen	0	10	6
West, J. L.	1	1	0
Wilby, Frederick W.	0	10	6
Woolley, G. J. B.	0	5	0
Leigh (Lancs.).			
Bennett, John W.	0	5	0
Leighton Buzzard.			
Herington, Joseph	1	1	0
Leith.			
Bowman, J.	0	5	0
Crichton, Alexander	0	5	0
Duncan, Flockhart Powell and Co.	0	10	6
Finlayson, Thomas	0	5	0
McDougall, R. I.	0	5	0
Mair, Alexander	0	5	0
Robertson, R.	0	2	6
Smith, Wilson and Sutherland	0	10	6
Lenton.			
Wilson, Thomas	0	5	0
Leominster.			
Davis, David F.	1	1	0
Sandiland, Robert B., jun.	0	5	0
Lerwick.			
Porteous, Arthur A.	0	2	6
Leven.			
Hogg, A.	0	2	6
Lewes.			
Briscoe, Charles (West Firle)	0	5	0
Head, John	0	10	6
Head, John T.	0	10	6
Leytonstone.			
Bennett, C.	0	2	6
Taylor, E.	0	2	6
Wilson, J.	0	2	6
Lincoln.			
Battle, Son and Maltby	0	10	6
Tomlinson, Charles K.	0	10	6
Woodcock, Page D.	0	5	0
Littleborough.			
Hall, Samuel	0	5	0
Little Brighton.			
Walker, Joseph	0	5	0
Little Chishill.			
Jefferson, Thomas	0	10	6
Littlehampton.			
Longman, J. H.	0	2	6
Smart, C. F.	1	1	0
Liverpool.			
Abraham, Alfred Clay	1	1	0
Abraham, Thomas Fell	1	1	0
Adams, Thomas E.	0	10	6
Adams, T. E., jun.	0	5	0
Albright, Henry	0	10	6
Alexander, George	0	5	0
Alexander, John	0	10	6

Liverpool—continued.	£	s.	d.
Allan, James H.	1	1	0
Ayrton and Saunders	0	10	6
Bain, John	0	5	0
Barrett, A. A.	0	5	0
Billington, Frederic	0	5	0
Blabey, J. J. (Woolton)	1	1	0
Blood, Charles (Formby)	0	5	0
Blundell, John	0	10	6
Brown, Edwin	0	2	6
Brown, Joseph	0	2	6
Buck, Richard C.	0	5	0
Clay, Dod and Co.	1	1	0
Coley, James	0	5	0
Coupland, Henry	0	10	6
Dickins, B.	0	5	0
Drawbridge, Joseph G.	0	10	6
Drawbridge, T. F.	0	5	0
Driver, John G.	0	5	0
Ellams, George	0	10	0
Elliott, Robert John	0	10	6
Evans, Sons and Co.	5	5	0
Fergusson, W. and J.	0	10	6
Fidler, T. W.	0	5	0
Field, C.	0	10	6
Fleming, Mrs. Agnes	0	5	0
Flint, John	0	10	6
Fowler, George	0	5	0
Fraser, Alexander	0	10	0
Furniss, Thomas	0	5	0
Galloway, J. B.	0	5	0
Greenall, Alfred	1	1	0
Hackett, Thomas	0	10	0
Hawood, Charles	0	5	0
Hay, T. A.	1	1	0
Hocken, Joshua	0	10	6
Hodges, E. G.	0	5	0
Jackson, H.	0	10	6
James, John	0	5	0
Johnson, E. E.	0	5	0
Johnson J. H. and S.	2	2	0
Jones, R. H.	0	5	0
Jordan, J. A.	0	5	0
Kirk, W. P.	0	5	0
Lee, Samuel W.	1	1	0
Lett, Arthur J.	0	5	0
McGuffie and Co.	1	1	0
MacKinlay, F. J.	1	1	0
Midgley, John E.	0	2	6
Morgan, H. B.	0	5	0
Parkinson, Richard	0	10	6
Parry, R.	0	5	0
Parry, William	0	5	0
Pheysey, Richard (Waterloo)	0	10	6
Richardson, Richard T.	0	10	6
Ridgway, T. E.	0	5	0
Sawden, Alfred	0	10	6
Smith, Henry	0	5	0
Smith, J. J. (Walton-on-the-Hill)	0	10	6
Smith, R. G.	0	5	0
Symes, Charles	3	3	0
Thomas, Robert	0	10	6
Thompson, John	1	1	0
Thompson and Capper	1	1	0
Tollit, W.	0	2	6
Troughton, Christopher	0	10	6
Ward, J. S.	0	5	0
Williams, William	0	5	0
Wokes, T. S.	0	5	0
Woodhead, H. C.	0	10	6
Wright, William	0	5	0
Llanbyther.			
Jones, J.	0	2	6
Llandilo.			
Hughes, Thomas	1	1	0
Williams, W. J.	0	2	6
Llandudno.			
Burton, Joseph	1	1	0
Sinclair, Mrs. M. A.	0	10	6
Llanelly.			
Evans, Gwilym	0	10	6
Jones, W. E.	0	2	6
Llangollen.			
Jones, Humphrey	0	5	0
Thomas, H. O.	0	5	0
Llanidloes.			
Jones, Thomas Pryce	0	2	6
Llanrwst.			
Jones, Owen	0	2	6
Llwynpia (near Pontypridd).			
Richards, J. W.	0	2	6

Loddon.	£	s.	d.
Ellis, T. W.	0	10	6
London.			
Adam, Miss A. M.	0	10	6
Adam, Miss J. S.	0	10	6
Adam, Miss L.	1	1	0
Allden, John	1	1	0
Allen, Charles B.	3	3	0
Amoore, Lewis P.	0	10	6
Applegate, Edwin	0	10	6
Arkinstall, William	1	1	0
Atkinson, James	0	5	0
Atkinson, John G.	1	1	0
Attwood, Henry E.	1	1	0
Austin, Henry Felix	1	1	0
Babb, James	0	5	0
Bacon, Henry J.	0	2	6
Bainbridge, John	0	5	0
Baines, Wm. H. (Connaught Street)	0	10	6
Baker, Alfred P.	0	10	6
Ball, The Chemists', per Mr. J. W. Bowen	21	0	0
Banbury, Richard	0	5	0
Barnard, John	1	1	0
Barnes, James Benjamin	1	1	0
Barnes, James Burden	0	5	0
Barret, Edward Louis	1	1	0
Barron, Frederick	5	5	0
Barry, Frederic	0	5	0
Bartle, W. F.	0	5	0
Bartlett, G. F. H.	0	5	0
Bartley, George A.	0	10	6
Bascombe, Frederick	0	5	0
Bascombe, William	0	5	0
Bassett, John	0	2	6
Bate, Henry	1	1	0
Bateman, T. H.	1	1	0
Beasley, Frederick	0	5	0
Beddard, John	1	1	0
Bedford, C.	0	10	6
Bell, Matthew W.	1	1	0
Bell, William H.	1	1	0
Bennett, George	0	5	0
Bennett, Thomas	0	5	0
Bently, William Jas.	0	10	6
Bessell, J. W.	0	5	0
Best, James	0	10	6
Bevan, William	0	10	0
Bigg, Thomas	1	1	0
Bindloss, G. F.	0	10	6
Bingley, Richard	0	10	6
Birch, Henry C.	1	1	0
Bird, Augustus	2	2	0
Bird and Storey	1	1	0
Bird, F. C. J.	0	5	0
Bird, Robert	0	10	6
Bishop, W. M.	0	2	6
Blake, Charles A.	0	10	6
Bland, John	0	10	6
Bletsoe, F. F.	0	10	6
Blyth, Utton	0	5	0
Boothby, H. N.	0	5	0
Bourdas, Isaiah	1	1	0
Bowen, John T.	0	10	6
Bowen, John W.	1	1	0
Bowles, W. J.	0	10	6
Brand and Co.	1	1	0
Branford, A. J.	0	5	0
Bridges, C. W.	0	10	6
Brodribb, J. B.	0	10	6
Brookes, Samuel	0	10	6
Brooks, Thomas	0	2	6
Broumpton, F. R.	0	2	6
Brown, Alfred James	0	10	6
Brown, Edgar M.	0	2	6
Buckle, Christopher Francis	0	10	6
Bull, E. John	0	5	0
Bullock, J. Lloyd and Co.	2	2	0
Bunker, James	0	10	6
Burden, C. H. B.	0	5	0
Burgoyne, Burbidges, Cyriax and Farries	2	2	0
Burn, Henry	0	5	0
Burroughs, S. M. (donation)	100	0	0
Burton, Joseph	0	5	0
Burton, Percy H.	0	2	6
Bush, Arthur	0	5	0
Butler, E. D. Barry	0	10	6
Butt, Edward Northway	10	10	0
Butterworth, John	0	5	0
Cadman, Daniel C.	1	1	0
Campbell, E. K.	0	5	0
Carteighe, Michael	1	1	0
Cartwright, William B.	0	10	6
Caseley, Thomas	0	5	0
Cawdell, George	0	10	6
Chapman, Joseph J.	0	10	6

London—continued.	£	s.	d.
Chapman, Walter	0	10	6
Charity, William	0	10	6
Chesterfield, T. M.	0	5	0
Churchill, J. and A.	1	1	0
Clapp, Edward F.	0	10	6
Clark, John A.	0	10	6
Clark, Thomas J.	0	10	6
Clarke, Isabella Skinner	0	10	6
Clarke, W. L.	0	5	0
Clayton, Thomas	0	5	0
Cocker and Son	0	10	6
Colchester, William M.	0	5	0
Cole, A. C.	1	1	0
Coleman, J.	0	5	0
Coles, Ferdinand	0	10	6
Coles, J. W.	0	10	6
Collett, Chas. B.	0	5	0
Collier, Henry	0	10	6
Constance, Edward	0	10	6
Constance, Herbert E.	0	10	6
Constance, Sidney W.	0	10	6
Cook, W. R.	0	5	0
Cooper, Albert	1	1	0
Cooper, Henry	0	10	6
Cooper, Wm. Henry	0	10	6
Cooper, William Temple	0	10	6
Corbyn, Stacey and Co.	1	1	0
Cosway, Edwin C.	1	1	0
Cottrill, John W.	0	10	6
Cox, F. H.	0	2	6
Cracknell, Herbert	0	10	6
Cresswell, Frederick	0	10	6
Crosby, John	0	2	6
Crosse and Blackwell (donation)	10	10	0
Crow, E. L.	0	10	6
Crowden, S. G.	0	10	6
Croyden, Charles	0	10	6
Cryer, Henry	0	5	0
Cull, Joseph	0	10	6
Cullen, Harry H.	0	5	0
Dampney, Richard S.	0	10	6
Darby and Gosden	2	2	0
Davenport, Horace	2	2	0
Davenport, J. T.	2	2	0
Davies, Llewelyn	0	2	6
Davies, Robert H.	1	1	0
Davis, H. S. E.	0	10	6
Davy, Yates and Routledge	2	2	0
Dean, S.	0	5	0
De Peare, John Thomas	0	5	0
Dewar, Mrs. Mary Ann	0	10	6
Dickson, J. C.	0	5	0
Dinneford and Co.	2	2	0
Dixon, Herbert	0	5	0
Dodd, W. R.	0	10	6
Doulton and Co.	1	1	0
Down, Dr. Langdon	1	1	0
Drury, Sydney	0	5	0
Dymott, Francis	0	5	0
Dyson, A.	0	5	0
Dyson, William B.	1	1	0
Eade, George	0	10	6
Eade, James	0	10	6
Eastman, J. E.	0	10	6
Edwards, Charles	1	1	0
Edwards, James	0	5	0
Edwards, William Staples	0	5	0
Elliott, J. D.	0	10	6
Ellis, C. J.	0	2	6
Ellithorne, A. H.	0	5	0
Ellwood, T. A.	0	5	0
Elvey, Thomas	1	0	0
Emson, William N.	0	5	0
Epps, James	1	1	0
Evans, Lescher and Webb	1	1	0
Evershed, G. S.	0	5	0
Fallowfield, Jonathan	1	1	0
Farmer, John	0	10	6
Faulkner, J. Ross	1	1	0
Fitch, Robert Owen	0	10	6
Forrest, Richard	1	1	0
Fox, William	1	1	0
Francis, G. Bult	1	1	0
Francis, George Baggett	1	1	0
ditto (donation)	10	10	0
Francis, Matthew R.	0	10	6
Francis, W. H.	0	10	6
Freeman, Frank	0	2	6
Froom, William Henry	1	1	0
Frost, John H.	0	5	0
Frost, W. T.	0	10	6
Gadd, Charles	0	10	6
Gadd, Robert	0	10	6
Gale, Samuel	1	1	0
Garman, C. E.	0	5	0
Garner, James	0	10	6
Garner, Thomas	0	5	0
Garnham, A. W.	0	5	0
Gaubert, Stephen	0	2	6
Gaunt, Rann Dolphin H.	1	1	0
Gerrard, A. W.	1	1	0
Glew, F. H.	0	5	0
Goddard, G. E.	0	5	0
Godfrey and Cooke	1	1	0
Godfrey, H. E.	0	5	0
Goff, Richard	0	5	0
Goldby, F.	0	5	0
Golds, L. G.	0	10	6
Goodall, W. A.	0	5	0
Goodchild, Alfred C.	0	5	0
Goodwin, John	1	1	0
Gordelier, F. H.	0	10	6
Gorton and Sons	0	10	6
Gossop, George K.	0	5	0
Gradidge, James H.	0	2	6
Graham, Henry	0	5	0
Granger, Edwin John	1	1	0
Green, Samuel	0	5	0
Green, W. J.	0	10	6
Greenish, Thomas	1	1	0
Greenish, T. Edward	0	10	6
Greig, W.	0	2	6
Griffin, J. W.	0	2	6
Gristock and Co.	1	1	0
Gudgen, Frederick G.	0	5	0
Gulliver, William	0	10	6
Gulliver, W. F.	0	5	0
Haddock, James	0	5	0
Hairsine, H. S.	1	1	0
Hall, Ralph	0	10	6
Hampson, Robert	1	1	0
Hanbury, Cornelius	1	1	0
Hannah, Charles	0	10	6
Hardy, Samuel C.	1	1	0
Harrington, I.	0	10	6
Harris, Frank William	0	5	0
Hart, Thomas	0	5	0
Harvey, Edward	1	1	0
Harvey, John William	0	2	6
Harvey, William	0	10	6
Harwood, Charles	0	10	6
Hatfield, George B.	0	10	6
Hatfield, George W.	0	5	0
Haward, G. R.	1	1	0
Hawkins, Thomas	0	10	6
Hayward, Charles	0	10	6
Hearn, John	0	5	0
Heath, Frederick D.	0	5	0
Henty, Henry Martin	0	5	0
Herbert, William	0	5	0
Hern, W. H.	0	5	0
Hewlett, J. C.	1	1	0
Hick, John	0	5	0
Hickey, Evan Lewis	0	10	6
Hickman, William	0	10	6
Hicks, Alexander D.	0	2	6
Higgins, James	0	10	6
Hill, Arthur B.	1	1	0
Hill, Arthur S.	2	2	0
Hill, William	0	5	0
Hillen, John	0	10	6
Hills, Thomas Hyde	10	10	0
Hills, Walter	2	2	0
Hobbs, John K.	0	5	0
Hodgkinson, George A.	0	10	6
Hodgkinson, Treacher and Clarke	2	2	0
Hodgkinson (Thomas), Prestons and King	2	2	0
Hodgkinson, William	1	1	0
Hodsoll, Thomas W. H.	1	1	0
Hogg, E. G.	0	10	6
Hogg, Robert	0	10	6
Holding, J.	0	5	0
Holford, T. Constantine	0	10	6
Holl, Edmund	0	5	0
Holmes, Walter M.	0	10	6
Holroyd, A.	0	2	6
Hopkin, William King	2	2	0
Hopkins, T. B.	0	2	6
Horne, John	0	5	0
Howard, E.	0	5	0
Howell, Maurice	0	10	6
Howse, W. F.	0	5	0
Howlett, Samuel	1	1	0
Hucklebridge, P. and W.	1	1	0
Hudson, T. F.	0	5	0
Huggins, Richard	0	10	6
Hughes, Evan	0	10	6
Hugill, John	1	1	0
Hugill, John H.	1	1	0
Humble, J. B.	0	5	0
Humphreys, Richard	1	1	0
Hunt, Charles	1	1	0
Huskisson, Henry Owen	2	2	0
Hyne, Harry	0	5	0
Hyslop, John Cahill	1	1	0
Icke, Henry S.	0	10	6
Idris and Co.	2	2	0
Ince, Joseph	1	1	0
Ingham, John	0	2	6
Ingram and Royle	1	1	0
Ive, William	1	1	0
Izod and Son	1	1	0
Jackson, Charles	0	10	6
Jackson, Christopher	0	10	6
Jameson, W. G., jun.	1	1	0
Jarvis, John S.	0	10	6
Jenkins, Henry	1	1	0
Jenkins, Thomas	0	10	6
Jobson, Thomas	0	10	6
Johnson and Sons	1	1	0
Jones, Edwin	0	5	0
Jones, Henry Stevens	0	5	0
Jones, John H.	0	10	6
Jones, Llewellyn	0	5	0
Jones, William	0	10	6
Jones, William	0	5	0
Jones, Wm. H.	0	10	6
Jones, W. H.	0	5	0
Jozeau, G.	1	1	0
Keeling, A. G.	0	5	0
Keer, Thomas H.	0	10	6
Kent, James S.	0	10	6
Kent, Thomas	0	10	6
Kent, Thomas Ramsey	0	10	6
King, E. B.	0	10	6
King, Henry	0	10	6
Kingan, D.	0	10	6
Kingsford, Frederick	1	1	0
Kinross, W. M.	0	5	0
Kirk, Snowden	0	10	6
Kitchin, J.	0	5	0
Langley, Frank C.	0	5	0
Lavers and Son	0	10	6
Laws, John	0	10	6
Layng, R. C.	0	10	6
Leake, Thomas W.	0	10	6
Legg, H. A.	0	10	6
Lescher, Joseph S.	1	1	0
Lewinton, Alexander B.	1	1	0
Lewis, T.	0	5	0
Lidwell, J. E.	0	10	6
Lister, W. B.	1	1	0
Littlejohn, A.	0	5	0
Llewhelin, Ivor V.	0	2	6
Lloyd, Isaac T.	0	2	6
Long, Henry	1	1	0
Long, Herbert H.	0	5	0
Longhurst, Edward	0	5	0
Longley, Charles	0	5	0
Lorimer and Co.	1	1	0
Loveday, F. J.	0	5	0
Lowe, William E.	2	2	0
Lyon, James	0	10	6
MacCrindle, Thomas	1	1	0
McDiarmid, F.	0	10	0
Macdonald, Alexander	0	10	6
McDougall, James	0	2	6
MacEwan, Peter	1	1	0
MacGeorge, William	0	10	6
Madeley, E. S.	0	10	6
Maitland, P. C.	0	10	6
Maizey, E.	0	10	6
Makepeace, A. J.	0	2	6
Mallett, Thomas J.	0	10	6
Marks (Henry) and Sons	1	1	0
Marsh, E. R.	0	10	6
Marston, John Thomas	0	10	6
Marten, Frederic	0	5	0
Martin, T. C. W.	0	10	6
Martindale, William	1	1	0
Mason, H. C.	1	1	0
Mathews, Henry	1	1	0
Matterson, J. K.	1	1	0
Matthews, J.	0	10	6
Mathews, J. H.	1	1	0
Matthews, J. H.	0	5	0
Maw, Charles	1	1	0
ditto (donation)	40	0	0
Maw, C. Trentham	1	1	0
Maw, Son and Thompson	2	2	0
Maxwell, P. H.	0	7	6
Maynard, H. R.	0	10	6
Meggeson and Co.	1	1	0
Mellin, Charles J.	0	5	0
Michie, Charles C.	0	5	0
Middleton, Francis	1	1	0
Miller, Cecil B.	0	5	0
Miller, Charles S.	0	5	0
Miller, F.	0	5	0
Miller, W. P. F.	0	5	0

London—continued.	£	s.	d.
Millhouse, H. H.	0	5	0
Minshull, Flora	0	5	0
Minshull, Rose C.	1	1	0
Moore, John	0	5	0
Morrell, Thomas	0	5	0
Moss, Thomas A.	0	2	6
Mowatt, J. Rodman	0	5	0
Mundy, Alfred O.	0	10	6
Mutch, John Pratt	0	5	0
Myers, William	0	10	6
Naylor, W. A. H.	0	10	6
Neame, A. J.	0	5	0
Newton, T. A. C.	1	1	0
Newzam, Henry Samuel	0	10	6
Nicholls, Reginald E.	0	5	0
Nicholson, Thomas T.	0	5	0
Nind, George	0	10	6
Ninnis, T. M.	0	5	0
Nobbs, W. M.	0	10	6
North, W. D.	0	10	6
Nurthen, F. R.	0	10	6
Ord, Septimus W.	0	5	0
Padman, Dr. John	0	10	6
Page, R. S.	0	5	0
Palmer, Francis	0	10	6
Palmer, Robert	1	1	0
Parker, F. P.	0	5	0
Parker, Robert Henry	0	10	6
Parkes, J. C.	0	10	6
Parkes, J. P.	1	1	0
Parkinson and Son	1	1	0
Parrott, Joseph	0	10	6
Parry, C. D.	0	5	0
Parsons, G. H.	2	2	0
Passingham, G. W.	0	10	6
Pattison, George	1	1	0
Peacock, George	0	5	0
Pears, A. and F. (donation)	10	10	0
Peat, Joseph	0	5	0
Peel, Alfred	0	10	6
Penrose and Son	1	1	0
Pettinger, Elmer	0	5	0
Pharmacy Club (per Richard Bremridge, Hon. Sec.)	10	10	0
Phillips, A. J.	0	5	0
Phillips, A. W.	0	5	0
Philpott, F. W.	0	5	0
Pickard, William	2	2	0
Pidduck, J. W.	0	10	6
Pierce, R. W. C.	0	5	0
Pinchen, W. J.	0	5	0
Pinyon, William	0	10	6
Plaister, W. J.	1	1	0
Plowman, Sidney	1	1	0
Plumbly, W.	0	2	6
Pond, B. C.	0	5	0
Pond, G. P.	1	1	0
Pope, A. H.	0	7	6
Portway, A. C.	0	5	0
Potts, Robert A.	1	1	0
Powell and Sons	1	1	0
Powell, T. H.	0	10	6
Preston, Richard	0	10	6
Pretty, Charles	0	5	0
Price, J. T.	0	2	6
Price, Robert John	0	2	6
Prichard, Edward	1	1	0
Prime, Thomas R.	0	10	0
Procter, R.	0	5	0
Puntan, H. H. C.	0	2	6
Radermacher, C. J.	0	10	6
Ragg, William	1	1	0
Ragg, W. W.	0	10	0
Rawlinson, Ralph	1	1	0
Reed, Charles W.	0	10	6
Rees, Harding	0	10	6
Richards, Edwin	0	10	6
Richardson, John	0	5	0
Ridley, E. H.	0	5	0
Rigden, George	0	2	6
Roach, H. W.	1	1	0
Roach, Pope	1	1	0
Robertson, George	0	10	6
Robinson, J.	0	5	0
Robinson, R. A.	0	10	6
Robinson, William P.	0	10	6
Rogers, James	0	10	6
Rose, Alfred	1	1	0
Rouse, F. W.	0	10	6
Rowntree, Thomas	0	10	6
Rutter, Edmund Yates	1	1	0
Rutter, John	0	10	0
Sadler, William	0	10	6
Sadler, William, jun.	0	10	6
Sainsbury, S.	1	1	0
Sandell, Thomas O.	0	10	6
Sanders, Francis T.	0	5	0

London—continued.	£	s.	d.
Sandford, Geo. W.	2	2	0
Sandy, Frederick William	0	10	6
Sanger and Sons	2	2	0
Sangster, Arthur	1	1	0
Saunders, C.	0	10	6
Savory and Moore	3	3	0
Sayers, W. C.	0	10	6
Scoley, Thomas E.	0	5	0
Sedcole, J. W.	0	10	6
Sell, W. H.	0	10	6
Shacklock, J. H.	0	10	6
Shapcott, W. H. P.	0	2	6
Sharman, Wm.	0	10	0
Shaw, E. H.	0	2	6
Shaw, J. W.	0	10	6
Shephard, Thomas F.	0	10	6
Shepley, Frederick Thos.	0	5	0
Sherburn, Thomas	0	10	6
Sherwood, N.	0	10	0
Shields, R. H.	0	5	0
Shirley, J. G.	2	2	0
Shirley, S. S.	0	10	6
Silverlock, Henry	5	5	0
Silvers, Francis T.	0	10	6
Sims, C. R. H.	0	5	0
Slack, Josiah W.	0	10	6
Slator, Henry	0	5	0
Slipper, James	0	10	6
Smart, John	0	10	6
Smart, W.	0	10	6
Smith, Harry J.	0	5	0
Smith, James W.	0	5	0
Smith, J. H.	0	10	6
Smith, John Ord	1	1	0
Smith, Percy John	1	1	0
Smith, William	0	10	6
Smith, William Frederick	1	1	0
Smith, William L.	0	10	6
Snell, Charles H.	0	10	6
Snell, Miss Marie de Vere	0	2	6
Snow, G. F.	0	2	6
Spurling, W.	0	10	6
Spyer, Newton	0	10	6
Squire and Sons	3	3	0
Stacy, Frederick	0	5	0
Stacey, Samuel Lloyd	1	1	0
Stamp, Edward B.	0	10	6
Stansfield, Richard	0	5	0
Starkie, Richard S.	1	1	0
Stenson, Joseph	0	5	0
Stephens, Henry I.	0	5	0
Stevens, Peter Augustus	0	10	6
Stickland, W. H.	1	1	0
Stoneham, Philip	0	10	6
Strachan, John	0	10	6
Stratton, William	0	2	6
Streater, James H.	0	10	6
Strongitharm, W. G.	0	5	0
Strother, C. J.	0	10	6
Sugden, W. A.	0	5	0
Summers, James R.	0	10	6
Swift, Francis	0	10	6
Symons, William H.	1	1	0
Tanner, A. E.	0	10	6
Taplin, William Gilbert	1	1	0
Taubman, Robert	0	10	6
Taylor, George S.	1	1	0
Taylor, Horatio	0	10	6
Taylor, John	0	10	6
Taylor, Peter	0	5	0
Tearle, W.	0	10	6
Tebbutt, Edwin	1	1	0
Temple, C. H.	0	2	6
Tench, S. E.	0	5	0
Thatcher, R.	0	2	6
Thomas, Harry A.	1	1	0
Thomas, Henry	1	1	0
Thomas, Horace	1	1	0
Thompson, Arthur S.	0	5	0
Thompson, C.	0	10	6
Thompson, Henry	0	10	6
Thompson, Henry Ayscough	1	1	0
Thompson, John	1	1	0
Thompson, R. W.	0	5	0
Thorn, John James	1	1	0
Tijou, Tom	0	5	0
Tingle, Miss Ellen	0	5	0
Tomlinson, Thomas	1	1	0
Tompsett, Leighton S.	0	5	0
Toon, Lionel E.	0	5	0
Trask, Thomas	1	1	0
Tregear, A. F.	0	5	0
Trick, William B.	0	10	6
Trotman, Alfred C.	0	10	6
Truman, H. V.	0	10	0
Tugwell, Ernest H.	0	10	6
Tugwell, William H.	0	10	6

London—continued.	£	s.	d.
Turner, Charles E.	0	10	6
Turner, Edward A.	1	1	0
Turner, R. C.	0	5	0
Tyrer, Peter	0	10	6
Upjohn, Francis W.	0	5	0
Van, Frederick W. S.	0	5	0
Vaughan, John	0	5	0
Vialls, J. B.	1	1	0
Vincent and Son	1	1	0
Walker, Byatt A.	0	5	0
Walker, C. J.	0	5	0
Walker, Charles	0	5	0
Walker, J. C.	0	5	0
Wallbridge, H. A.	0	5	0
Wallis, John T. W.	0	10	6
Wallis, Owen	0	10	6
Walton, F. M.	0	5	0
Ward, Francis	0	10	6
Warren, F. W.	0	10	6
Warren, G. R.	0	10	6
Warren, William	0	10	6
Warrick Brothers	1	1	0
Wastie, Francis	1	1	0
Watson, William	0	10	6
Watts, Edward	0	5	0
Watts, J. N.	1	1	0
Wavell, Edward	1	1	0
Wegg, W. N.	0	5	0
Wells, Thomas	0	5	0
West, Charles	1	1	0
Weston, Samuel John	1	1	0
Westrup, Joseph B.	0	10	6
Whiffen, Thomas	5	5	0
Whigham, Robert L.	0	5	0
White, Charles	1	1	0
White, Charles E.	0	5	0
Whittle, Elias C. C.	0	5	0
Widgery, John	0	5	0
Wigg, Henry J.	1	1	0
Wiggins, Henry	0	10	6
Wigginton, Alfred	0	5	0
Wilkes and Rich	0	10	6
Wilkinson, Benjamin John	0	10	6
Wilkinson, Robert	0	5	0
Wilkinson, William	0	10	6
Wilkinson, W. H.	0	5	0
Will, William W.	0	5	0
Willats, Richard	0	5	0
Williams, Alfred	0	5	0
Williams, Hugh	0	5	0
Williams, John	2	2	0
Williams, J. W.	1	1	0
Williams, Stephen	0	5	0
Williams, Thomas H.	0	10	6
Willows, Francis and Butler	3	3	0
Wilson, Alexander W.	0	5	0
Wilson, James	1	1	0
Wilson, John C.	0	10	6
Wilson, Thomas W.	0	10	6
Wink, J. A.	1	1	0
Wisken, Robert	0	10	6
Wodderspoon and Co.	1	1	0
Wood, C. H.	0	10	6
Wood, Jacob	1	1	0
Woodland, John	1	1	0
Woollings, Frank	0	2	6
Wooster, J. R.	1	1	0
Wootton, Alfred C.	2	2	0
Worsley, A. G.	0	5	0
Wright, Layman and Umney	2	2	0
Wyatt, Francis J.	0	10	6
Wyatt, William	0	5	0
Wylde, George	0	10	6
Yates, Robert	1	1	0
Yates, Samuel P.	0	5	0
Yeatman, F. J.	0	2	6
Young, George	0	5	0
Long Bennington.			
Bemrose, John	0	10	6
Longton.			
Fisher, G.	0	5	0
Hemming, G. T.	0	5	0
Prince, Arthur G.	0	10	0
Turner, Thomas	0	5	0
Looe (Cornwall).			
Poad, John	0	5	0
Lossiemouth.			
Bremner, James	0	5	0
Loughborough.			
Scrase, Richard	0	5	0
Loughton (Essex).			
Harrison, J.	0	5	0

Louth.	£	s.	d.
Allenby, E.	0	2	6
Moody, S. W.	1	1	0
Lowestoft.			
Chaston, Anna Maria	0	10	6
Good, Thomas	0	10	6
Jeacock, F. D.	0	2	6
Moverley, Robert	0	10	6
Ludlow.			
Marston, Alfred	0	5	0
Nickson, James	0	5	0
Smith, F. W.	0	2	6
Woodhouse, George	0	5	0
Luton.			
Chantler, R. P.	0	5	0
Duberly, G. S.	0	5	0
Hall, Ephraim	0	5	0
Mason, A. H.	0	2	6
Webb, John H.	0	2	6
Lutterworth.			
Brown, Thomas	0	10	6
Lyme Regis.			
Henley, George	0	5	0
Lymington.			
Allen, Adam U.	0	5	0
Badcock, Henry	0	5	0
Lymm.			
Evans, Isaac H.	0	5	0
Henshall, James	0	5	0
Lytham.			
Hartley, John	0	7	6
Macclesfield.			
Bates, William I.	0	10	6
Bower, John	0	5	0
Charge, A. W.	0	5	0
Cooper, Thomas	0	5	0
Duncalf, Thomas H.	0	10	6
Wood, Richard	0	10	6
Macduff.			
McMurtrie, John	0	5	0
Maidenhead.			
Barry, Thomas S.	0	10	6
Cottingham, Joseph J.	0	5	0
Walton, Ralph	0	10	6
Maidstone.			
Anning, A.	0	5	0
Corfe, Alfred	0	5	0
Rogers, William	0	5	0
Rowcroft, Albert E.	0	5	0
Simpson, John W. G.	0	10	6
Stonham, Thomas G.	0	10	6
Maldon (Essex).			
Crick, George E.	0	10	6
Elsey, Charles	0	5	0
Wallworth, David	0	10	6
Malmesbury.			
Ratcliffe, H. N.	0	10	6
Malta.			
Carter, J. M.	0	5	0
Malton (Yorks).			
Buckle, James	0	5	0
Hardy, George	0	5	0
Harrison, William	0	10	6
Laverack, W. H.	0	5	0
Malvern.			
Coldwell, David B.	0	10	6
Fox, T.	0	5	0
Holdcroft, F. J.	0	10	6
Malvern Wells.			
Clark, Edward J.	0	5	0
Wakefield, Cecil H.	1	1	0
Manchester.			
Ashworth, R.	0	5	0
Balmforth, A.	1	1	0
Bates, Frederic W.	0	5	0
Bell, James	0	2	6
Benger, F. Baden	1	1	0
Bew, John	1	1	0
Billington, John	0	2	6
Blain, Alfred L.	0	5	0
Blyton, John	0	10	6
Boor, Frederick	0	10	6
Booth, William G.	0	10	6

Manchester—continued.	£	s.	d.
Bostock, Charles	0	2	6
Breadner, C. G.	0	5	0
Brooks, Joseph	1	1	0
Broughton, Thomas	0	2	6
Brown, William Scott	1	1	0
Bullock, A. H. (Salford)	0	2	6
Burgess, J. S.	0	5	0
Burnet, G.	0	2	6
Bushby, Thomas	0	5	0
Campbell, Wm.	0	5	0
Carruthers, J. B.	0	2	6
Carter, William	0	10	6
Cowpe, M.	0	2	6
Darling, William	1	1	0
Dawson, Robert	0	5	0
Denton, J. (Salford)	0	5	0
Edwards, G.	0	5	0
Fairbrother, D.	0	2	6
Ferriday, Dr. W. (Ardwick)	0	2	6
Gardner, E. (Salford)	0	2	6
Gavin, J.	0	5	0
Gavin, Thomas	0	10	6
Gibbons, Thomas G.	1	1	0
Gibbons, Walter	0	10	6
Gibson, Robert	1	1	0
Glanville, R.	0	5	0
Goodman, T.	0	2	6
Gourlay, H. H.	0	2	6
Gourlay, R. G.	0	2	6
Hall, Henry Stacey	0	5	0
Harding, E.	0	5	0
Hart, James	1	1	0
Hatch, J. O.	0	5	0
Hedley, J.	0	2	6
Heys, E.	0	2	6
Hilditch, T.	0	5	0
Holt, H. C.	0	2	6
Holt, John	0	5	0
Hughes, Evan G.	0	10	0
Inglis, H.	0	5	0
Jacklin, A.	0	5	0
Jackson, George	0	10	6
Jackson, Thomas	0	10	6
Johnson, W. H. (Salford)	0	10	6
Jones, John (Salford)	0	5	0
Jones, John J.	0	2	6
Jones, Joseph	0	2	6
Jones, P. V.	0	5	0
Kemp, Harry	0	5	0
Lane, William	0	5	0
Leech, Robert	0	5	0
Lord, John (Salford)	0	5	0
Marsden, Thomas B. (Withington)	0	10	6
Marsden, W.	0	5	0
Massey, J.	0	5	0
Mayor, D.	0	5	0
McCormick, F. H.	0	7	6
Middleton, C.	0	2	6
Morris, J. L.	0	5	0
Mundey, H.	0	5	0
Nuttall, R. H.	1	1	0
Osborne, T. C. E.	0	2	6
Paine, Standen	1	1	0
Pickup, Robert L.	0	10	6
Pidd, Arthur J.	0	10	6
Pigot, Samuel	0	2	6
Pratt, G. W.	0	5	0
Ritchie, T.	0	2	6
Roberts, W. R.	0	5	0
Rowland, E. E.	0	10	6
Royle, John	0	5	0
Sanderson, G. C.	0	5	0
Scaife, Samuel	0	10	6
Smith, E.	0	5	0
Smith, H. R.	0	2	6
Smith, J. L.	0	2	6
Standring and Co.	1	1	0
Sugden, Samuel	0	10	6
Summer, T.	0	2	6
Sutcliffe, C. H.	0	5	0
Swinn, Charles	1	1	0
Taylor, J. J.	0	2	6
Teasdale, C.	0	10	6
Terry, Thomas (Withington)	0	5	0
Thomas, J.	0	2	6
Tucker, C. H.	0	5	0
Turner, W. S.	0	10	6
Twemlow, Richard	0	10	6
Vernon, A.	0	2	6
Walton, D.	0	2	6
Waugh, J. (Salford)	0	5	0
Wealthall, Alfred	0	10	0
West, Thomas	0	5	0
Westmacott, George H.	0	10	6
Wheeldon, James	0	5	0
Whitaker, T.	0	5	0
Whittaker, Ellis (Salford)	0	10	6

Manchester—continued.	£	s.	d.
Whitfield, C. (Salford)	0	10	6
Wild, John	0	5	0
Wilkinson, George	0	5	0
Wilkinson, William	1	1	0
Williams, J. B.	0	10	0
Wilson, H.	0	5	0
Wood, G. E.	0	5	0
Woolley, Sons and Co.	5	5	0
Wright and Barnaby	1	1	0
Yates, Ebenezer	0	5	0
Mansfield.			
Adams, Benjamin	1	1	0
Patterson, Douglas J.	0	10	0
March.			
Davies, P. H.	0	5	0
Vawser, Jesse	0	5	0
Margate.			
Baily, John	0	10	6
Candler, Joseph T.	0	10	6
Gale, Henry	0	10	6
Gilson, C. B.	0	10	6
Harvey, William S.	0	10	6
Stimpson, George	1	1	0
Wootton, Edward S.	0	10	6
Market Drayton.			
Cooke, William	0	5	0
King, William George	1	1	0
Market Harborough.			
Adams, H. G.	0	5	0
Bragg, W. B.	0	5	0
Deacon, Fanny E. (Fleckney)	0	5	0
Marton (New Zealand).			
Wilton, M. H.	1	1	0
Maryport.			
Cockton, John	0	5	0
Masham (Yorks).			
Parker, Mathew M.	1	1	0
Matlock Bath.			
Platt, William	0	5	0
Mayfield.			
White, Edward A.	0	5	0
Melbourne (Victoria).			
Davies, E. C. J.	0	10	0
Jackson, A. H.	1	1	0
Melton Mowbray.			
Attenburrow, Jas.	0	5	0
Betts, W.	0	5	0
Gill, Josiah	0	5	0
Wing, G. N.	0	5	0
Middlesborough.			
Buck, Thomas	0	5	0
Hume, William A.	0	5	0
Taylor, H. H.	0	5	0
Taylor, William R.	0	5	0
Middlewich.			
Holland, H.	0	5	0
Millom.			
Roberts, John L.	0	2	6
Minchinhampton.			
Simpkins, John	0	10	6
Mirfield (Yorks).			
Crook, Charles	0	5	0
Monmouth.			
Marsh, G. W. F.	0	10	6
Montrose.			
Burrell and Son	0	5	0
Davidson, A.	0	5	0
Morecambe.			
Birkett, John	0	5	0
Morpeth.			
Marshall, G. T.	0	5	0
Schofield, F. E.	0	5	0
Morthoe.			
Compton, A.	0	10	6
Murrayfield (Midlothian).			
Baildon, H. B.	1	1	0
Mussoorie (India).			
Samuel, James B. and Edward	1	1	0

Nantwich.	£	s.	d.
Manley, Henry (Aston)	0	2	6
Narberth.			
Williams, W.	0	5	0
Neath.			
Hutchins, Charles	0	2	6
Needham Market.			
Harrington, Allen	0	10	6
Nelson.			
Collins, M. A.	0	5	0
Newark.			
Bennett, William	0	5	0
Cherrington, G. W.	0	5	0
Cooling, W. J.	0	10	6
Field, W. C.	0	5	0
Fisher, Harry	0	5	0
Foster, H. P.	0	5	0
March, William	0	5	0
Taylor, John, and Son	0	10	0
New Barnet.			
Thompson, F.	0	5	0
Young, Robert Fisher	0	10	6
New Brighton.			
Rose, Charles	0	5	0
New Brompton (Kent).			
Willis, Henry J.	0	5	0
Newbury.			
Davis, Henry J.	0	10	6
Hickman and Metcalf	0	10	6
Pratt, Thomas H.	0	10	6
Newcastle Emlyn.			
Rees, D.	0	5	0
Newcastle-on-Tyne.			
Bolan, John	0	10	6
Coates, John M.	0	10	6
Cormack, G.	0	5	0
Coxon, I.	0	2	6
Forster, J. R.	0	5	0
Frater, G.	0	10	0
Gatward, O.	0	5	0
Ismay and Sons	0	10	6
Marley, William	0	10	6
Martin, J.	0	5	0
Martin, N. H.	1	1	0
Owen, William	0	10	6
Proctor, Son and Clague	1	1	0
Proctor, William	0	5	0
Rheeder, T.	0	5	0
Richardson, George	0	2	6
Spargo, H.	0	5	0
Stuart, Charles E.	0	10	6
Ward, Benjamin	0	5	0
Watson, Mason	0	10	6
Weddell, G.	0	10	6
Wilkinson, T. T.	0	5	0
Wright, Alfred	0	10	6
Newcastle-under-Lyne.			
Fudge, H. D.	0	5	0
Heathcote, Thomas S.	0	10	6
Poole and Son	0	10	6
Newhaven.			
Granger, Harold	0	5	0
Miller, Alexander S.	0	2	6
Noble, Alexander	0	2	6
Newmarket.			
Barrow, Frank A.	1	1	0
Rogers, Mrs. A.	0	10	6
Newport (Isle of Wight).			
Millidge, Alfred	0	5	0
Shepperd, William J.	0	5	0
Newport (Mon.).			
Atkins, A. E.	0	5	0
Evans, David	0	5	0
Faulkner, H.	0	5	0
Garrett, T. P.	0	5	0
Gratte, Henry J.	0	5	0
Paine, Charles	0	10	6
Phillips, James W.	0	5	0
Phillips, John	0	10	6
Price, George	0	5	0
Seys, James A.	0	5	0
Smith, Albert	0	5	0
Thomas, Lewis	0	2	6
Young, John	0	10	6

Newport (Salop).	£	s.	d.
Barlow, John	0	10	0
Picken, Thomas William	0	5	0
Newton Abbot.			
Stiling, John E.	0	10	6
Wright, W.	0	5	0
Newton Stewart.			
Keith, John	0	2	6
Newtown (Mont.).			
Morgan, Richard	0	10	6
Norbiton.			
Greenwood, J.	0	10	6
Northallerton.			
Fairburn, Joseph	0	10	6
Squince, J. A.	0	5	0
Northampton.			
Ashford, Evan Charles	0	5	0
Barry, James	1	1	0
Bingley, John	0	10	6
Blunt, J. H. and Co.	0	10	0
Clower, John	0	5	0
Kirby, Frederick	0	5	0
Mayger, William D.	0	10	6
Negus, Samuel T.	0	5	0
Sindall, J. W. (Executors of)	0	5	0
Northfleet.			
Lucas, Joseph M. M.	0	5	0
North Walsham.			
Bailey, George Wm.	0	5	0
Northwich.			
Clough, John	0	10	0
Deakin, J. W.	0	5	0
Humphreys, Griffith	0	5	0
Lee, William	0	5	0
Norwich.			
Betts, George	0	10	6
Caley, Albert J.	0	10	6
Corder, Edward	0	10	6
Corder, Octavius	1	1	0
Cossey, John	0	5	0
De Carle, H. E.	0	5	0
Gardiner, W.	0	5	0
Hayhoe, W.	0	5	0
Heaver, Arthur W.	0	5	0
King, H. A.	0	5	0
Mallett, H. P.	0	5	0
Mason, Philip H.	0	10	6
Nuttall, Edwin	0	10	6
Pitts, W. C.	0	5	0
Robinson, James	0	5	0
Smith, Joseph de Carl, jun.	0	10	6
Squirrell, M. P.	1	1	0
Sutton, Francis	0	10	6
Taylor, H. E.	0	5	0
Thompson, H.	0	5	0
Watson, J. E. H.	0	10	6
Nottingham.			
Beilby, A. E.	0	5	0
Dadley, Elijah	0	10	6
Edgson, Hugh	0	10	6
Fletcher, Thomas B.	0	5	0
Flowerdew, W. C.	0	2	6
Gill, William	0	5	0
Lumby, Fred	0	5	0
Manfull, H. J.	0	5	0
Middleton, A.	0	5	0
Parker, W. H.	0	10	0
Pearson, Edward	1	1	0
Rayson, J. T.	0	5	0
Robinson, Joseph	0	5	0
Shippam, Henry	0	2	6
Smithurst, John	0	10	6
Solomon, W. H.	0	5	0
Taylor, Thomas C.	0	10	6
Watkinson, Thos.	0	10	6
Nuneaton.			
Iliffe, George	0	5	0
Lester, Henry	0	5	0
Oban (N.B.).			
Lawrence, S.	0	5	0
Robertson, A.	0	2	6
Odiham.			
Woodman, George	0	5	0
Oldbury.			
Homes, Joseph P.	0	5	0

Oldham.	£	s.	d.
Bagshaw, Henry B.	0	10	6
Bagshaw, William	0	10	6
Bates, Henry	0	10	6
Bates, Hiram	0	5	0
Berry, Thomas	0	5	0
Braddock, George	1	1	0
Brelsford, James	0	10	6
Geddes, William	0	5	0
Glover, J.	0	2	6
Hargraves, H. L.	0	10	6
Haslop, William	0	5	0
Hurst, James	0	5	0
Lees, James	0	2	6
Lord, Robert B.	0	5	0
Tomlinson, A. G.	0	5	0
Wilson, Alexander G.	0	5	0
Ormskirk.			
Garside, S. A.	0	5	0
Oswestry.			
Evans, John	0	5	0
Roberts, William Carey	0	2	6
Smale, Mary E.	0	5	0
Smale, Richard B.	0	5	0
Vaughan, David	0	10	6
Otley (Yorks).			
Lockwood, T.	0	5	0
Pratt, Richard M.	0	10	6
Over Darwen.			
Shorrock, R.	0	5	0
Oxford.			
Bloxham, W. E.	0	5	0
Clayton, C.	0	2	6
Court, G. F.	0	5	0
Druce, George C.	0	5	0
Hill, James H.	0	5	0
How, R. E.	0	5	0
Jenkins, Alexander	0	5	0
Prior, George T.	0	10	6
Squire, James	0	5	0
Thurland, Henry	0	10	6
Walsh, Edward	0	10	6
Paignton.			
Riches, T.	0	5	0
Sherriff, George	0	5	0
Paisley.			
McNichol, John	0	5	0
Paris.			
Saunders, W. H.	0	10	6
Partick (N.B.).			
Rait, Robert C.	0	10	6
Paterson (New Jersey), U.S.A.			
Oates, E. B.	0	10	6
Pau (France).			
Jarvis, John	1	1	0
Paulton (Somerset).			
Bush, Thomas	0	5	0
Pembroke Dock.			
Bowling, J. H.	0	2	6
Laen, William	0	5	0
Penarth.			
John, W. D.	0	5	0
Pendleton.			
Jeans, Thomas R.	0	5	0
Penrith.			
Biggs, F. W.	0	2	6
Redfern, Tom	0	10	6
Penzance.			
Buckett, A. H.	0	5	0
Shakerley, Benjamin	0	5	0
Symons, N. H.	0	5	0
Pershore.			
Smith, Arthur W.	0	5	0
Perth.			
Donald, David	0	10	6
Farquhar, James	0	2	6
Peterborough.			
Bloodworth, Thomas	0	2	6
Bodger, J. W.	0	2	6
Booth, Samuel	0	2	6

Peterborough—continued.	£	s.	d.
Bright, Richard H. D.	0	2	6
Carlton, Arthur	0	10	6
Dye, C. P.	0	5	0
Heanley and Saunders	0	10	6
Ibberson, F.	0	2	6
Knight, W. T.	0	10	6
Pearson, John H.	0	5	0
Sturton and Sons	0	10	6
Turner, R. P.	0	2	6
Whitwell, Ewen	0	5	0
Willson, Stephen J.	0	10	6
Petersfield.			
Nichols, Frederic B.	0	5	0
Pinner.			
Wilkinson, T.	1	1	0
Plymouth.			
Adams, W. T.	0	5	0
Allen, Joseph	0	10	6
Bailey, John H.	0	5	0
Balkwill, A. P.	2	2	0
Barge, John	0	5	0
Cocks, James	0	5	0
Foster, F. H.	0	5	0
Goodwin, Medmer	0	10	6
Hearder, H. P.	0	10	6
Hetherington, A. H.	0	5	0
Hunt, F. W.	0	10	6
Lloyd, Henry	0	5	0
Luke, R. S.	0	5	0
Maitland, F.	0	5	0
Martin, John	0	5	0
Maurice, James	2	2	0
Park, Charles J.	0	10	6
Roper, R. F.	0	5	0
Sloggett, Thomas C.	0	5	0
Turney, Samuel B.	0	5	0
Woods, W. H.	0	5	0
Woods, William	1	1	0
Pocklington.			
Boyden, John A. C.	0	2	6
Pontefract.			
Bratley, William	0	5	0
Hodgson, George	0	5	0
Pontypool.			
Ford, Edward B.	0	10	6
Pontypridd.			
Arnott, Daniel	0	2	6
Cule, Taliesin	0	10	6
Jones, J. P.	0	10	6
Prothero, G. R.	0	2	6
Poole.			
Atkins, T. W.	0	5	0
Pomeroy, F. T.	0	5	0
Port Elizabeth (Cape Colony).			
Willet, John A.	0	10	6
Porth.			
Davies, Thomas	0	5	0
Evans, Mrs. Annie	0	5	0
Porthcawl.			
Thomas, J. J.	0	5	0
Portland.			
Childs, Joseph L.	0	5	0
Porto Alegre (Brazil).			
Hallawell, J.	1	1	0
Portobello.			
Nesbit, John	1	1	0
Portsmouth.			
Bailey, H. H.	0	2	6
Mumby, Charles and Co.	1	1	0
Portsoy.			
Clark, James	0	2	6
Port Talbot.			
Williams, Moses	0	5	0
Poulton-le-Fylde (Lancs.).			
Blade, E.	0	5	0
Preston.			
Arkle, C. A.	0	2	6
Parker, Thomas	0	5	0
Pemberton, William	0	2	6
Sharples, George	0	5	0
Willan, William	0	5	0

Ramsey (Hunts.).	£	s.	d.
Palmer, Frederick W.	0	10	6
Ramsgate.			
Franks, Alfred	0	5	0
Jones, W. S.	0	5	0
Morton, Henry	0	5	0
Pavey, H. J.	0	5	0
Puckey, W.	0	5	0
Saunders, Charles J. H.	0	2	6
Reading.			
Bradley, Charles	0	10	6
Brunsden, Edward	0	2	6
Butler, B. H.	0	5	0
Cardwell, E.	0	10	6
Coles, S. J.	0	5	0
Craft, James	0	5	0
Cross, John	0	2	6
Hayward, S.	0	2	6
Hayward William G.	0	5	0
Knowles, J. H.	0	5	0
Parkes, W. E.	0	2	6
Rowell, John C.	0	5	0
Tunbridge, Frederick	0	5	0
Young, J. M. (Theale)	0	5	0
Redditch.			
Moule, William	0	5	0
Redhill.			
Foster, E. M.	1	1	0
Ralling, Ernest L.	0	10	6
Sillitoe, F. S.	1	1	0
Reepham.			
Cripps, Johnson	0	10	6
Reigate.			
Hayllar, J.	0	2	6
Sargant, J.	0	10	6
Retford.			
Baker, William	0	10	6
Westbrooke, Dr. C.	1	1	0
Rhyl.			
Lawrence, George R.	0	10	6
Rhymney.			
Dixon, Franklin	1	1	0
Roberts, William (Pontlottyn)	0	5	0
Richmond (Surrey).			
Bletsoe, John	0	10	6
Hornby, Alfred	0	10	6
Melvin, G.	0	2	6
Mumbray, R. G.	0	10	0
Thacker, William	1	1	0
Ripon.			
Parkin, J. B.	0	10	6
Thornley, F.	0	5	0
Rochdale.			
Bamford, J. W.	0	5	0
Duckworth, Arthur	0	5	0
Hadfield, James	0	5	0
Highley, William	0	5	0
Kerr, William	0	2	6
Mason, Arthur	0	2	6
Partington, William	0	2	6
Porter, T.	0	5	0
Scott, W. A.	0	5	0
Taylor, Edward	0	5	0
Taylor, John	0	2	6
Whittaker, J. W.	0	2	0
Wood, John	0	5	0
Rochester.			
Brown, Hugh S. F.	0	10	6
Cowan, Frank	0	5	0
Hewitt, Joseph S.	0	5	0
Watts, G. W.	0	5	0
Rock Ferry.			
Blenkiron, J.	0	2	6
Dutton, John	0	10	6
Roehampton.			
Swain, James	0	5	0
Rome.			
Barrass, T. E.	0	5	0
Romford.			
Lasham, John W.	0	10	6
Ridley, C. H.	0	5	0
Ross.			
Matthews, T. A.	0	5	0

Rothbury.	£	s.	d.
Farrage, Robert	0	10	6
Rotherfield.			
Field, William	0	5	0
Rotherham.			
Bradshaw, C. H.	1	1	0
Horsfield, J. M.	0	5	0
Rothesay.			
Duncan, William	0	5	0
Macintosh, Archibald	0	5	0
Rugby.			
Catterns, H. P. (Yelvertoft)	0	10	6
Clerke, W. B.	0	5	0
Ruthin.			
Magin, Arthur E.	0	2	6
Rouw, T. J.	0	5	0
Ryde (Isle of Wight).			
Dixon, Henry	0	10	6
Gibbs, William	0	10	6
Pollard, Henry H.	0	10	6
Smith, Tenison	0	10	6
Smith, William	0	5	0
Rye (Sussex).			
Waters, William A.	0	10	6
Saffron Walden.			
Hutchin, W. F.	0	5	0
Machon, H.	0	15	6
St. Albans.			
Allenby, Henry	0	2	6
Ekins, Arthur E.	0	10	6
St. Andrews.			
Govan, Alexander	1	1	0
Kermath, W. R.	0	5	0
Kirk, John J.	0	2	6
St. Bees.			
Broomfield, R. W.	0	10	6
St. Clears.			
Johns, John	0	2	6
Williams, Evan	0	10	6
St. Davids.			
David, Albert	0	2	6
St. Day.			
Corfield, Charles	0	10	6
St. Helens.			
Cotton, J. C.	0	10	6
Harrison, James	0	5	0
Sherlock, Thomas	0	5	0
St. Just.			
Wearing, John	0	2	6
St. Leonards. See Hastings.			
St. Mary Cray.			
Heath, Thomas	0	5	0
St. Neots.			
Mellor, J. G.	0	5	0
Wise, James	0	5	0
Sale.			
Smith, Allen	0	5	0
Salisbury.			
Atkins, Samuel Ralph	1	1	0
Atkins, William R.	0	10	6
Hardy, R. E.	0	5	0
King, L. W.	0	5	0
Newton, J. W.	0	10	6
Orchard, E	0	10	6
Rowe, J.	0	5	0
Saltash.			
Mathew, William H.	0	5	0
Saltburn-by-the-Sea.			
Taylor, William	0	10	6
Sandbach.			
Gee, G. H.	0	2	6
San Remo (Italy).			
Squire, Frank R.	1	1	0
Sandgate.			
Jenner, William M.	0	5	0
Sandown (Isle of Wight).			
Cocksedge, H. B.	0	10	6

Sandwich.	£	s.	d.
Baker, Frank	0	10	6
Dixon, William (Ash)	0	5	0
Woodruff, A. E. (Eastry)	0	5	0
Scarborough.			
Chapman, Henry	0	10	6
Clare and Hunt	1	1	0
Cuttle, Arthur E.	0	2	6
Hill, R. M.	0	2	6
Hughes, John E.	0	10	6
Smith, John F.	0	5	0
Whitfield, John	1	1	0
Seacombe.			
Hinkley, E.	0	2	6
Holt, Richard W.	0	5	0
Seaham Harbour.			
Storey, W.	0	5	0
Seaton.			
Skinner, A. J. P.	0	5	0
Selkirk.			
Dunn, Thomas	0	5	0
Settle			
Shepherd, J. W.	0	10	6
Shanklin (Isle of Wight).			
Brown, Andrew Henry	0	10	6
Deeks, W. T.	0	2	6
Sheepshed.			
Moore, Thomas	0	5	0
Sheerness.			
Hills, William	0	2	6
Prosser, David	1	1	0
Rayner, William	0	5	0
Sheffield.			
Basker, J. P.	0	2	6
Bennett, R.	0	5	0
Bradwall, J. H.	0	5	0
Carr, George	0	5	0
Clayton, William	0	10	6
Colton, W. H.	0	2	6
Cubley, G. A.	0	10	6
Dobb, J. T.	0	10	6
Dunnill, G. H.	0	5	0
Ellinor, George	0	10	6
Elliott, John G.	1	1	0
England, H.	0	5	0
Eyre, S.	0	5	0
Fox, A. R.	0	10	6
Froggatt and Son	0	5	0
Furness, Joseph M.	0	5	0
Gibson, J. C.	0	5	0
Grierson, G. A.	0	5	0
Griffin, J. T.	0	5	0
Harrison, Thomas M.	0	5	0
Hewitt, J. P.	0	5	0
Ibbitt, H. E.	0	2	6
Jepson, Zeno	0	5	0
Lowe, S. P.	0	5	0
Marshall, J.	0	5	0
Maxey, W. H.	0	5	0
Miller, John T.	0	5	0
Morrison, C. O.	0	5	0
Newsholme, G. T. Wilkinson	1	1	0
Owen, G. B., jun.	0	5	0
Owen, W.	0	5	0
Preston, Job	0	10	6
Priestley, Henry	0	10	6
Radford, Charles	0	5	0
Reckless, W.	0	10	6
Salisbury, John M.	0	10	6
Stevenson, W.	0	5	0
Ward, William	0	10	6
Watson, H. G.	0	5	0
Watson, Robert W.	0	10	6
Watts, J.	0	5	0
Whaley, T. C.	0	2	6
Wiles, Edwin	0	5	0
Wing, W.	0	2	6
Shepton Mallet.			
Cottrill, Gilbert Jones	0	5	0
Fudge, Charles William	0	5	0
Shields, North.			
Burn, Thomas	0	2	6
Corder, Walter S.	0	10	6
Gibson, James	0	10	6
Hogg, Joseph F.	0	2	6
Kirkness, R.	0	2	6
Stobbs, Robert	0	10	6

Shields, South.	£	s.	d.
Forrest, Robert	0	5	0
Noble, John	0	5	0
Walker, James	0	2	6
Shifnal.			
Clarke, Thomas E.	0	5	0
Shrewsbury.			
Adams, William	1	1	0
Blunt, T. P.	1	1	0
Cross, A. R.	0	5	0
Cross, William G.	3	3	0
Gouldbourn, William	0	10	6
Perkins, Christopher	0	5	0
Pyefinch, John	0	5	0
Salter, Benjamin	1	1	0
Salter, Joseph B.	1	1	0
Sidmouth.			
Chessall, Rowland	0	5	0
Silverdale.			
Wilson, Edward	0	5	0
Sittingbourne.			
Cocking, T. S.	0	5	0
Gordelier, William G.	1	1	0
Skipton.			
Wilks, R.	0	5	0
Sleaford.			
Harrison, T. E.	0	5	0
Slough.			
Elliman, Sons and Co.	1	1	0
Griffith, Richard	0	10	6
Smallthorne.			
Fletcher, Thomas	0	10	6
Snaith.			
Bean, John	0	10	6
Southam.			
Archer, Thomas	0	2	6
Southall (Middlesex).			
Diggens, E. D.	0	5	0
Southampton.			
Alderslade, W.	0	5	0
Bates, William	0	5	0
Bishop, Samuel	0	5	0
Borchert, Heinrich T. G.	1	1	0
Dawson, Oliver R.	0	10	6
Fletcher, J. B. (Totton)	0	5	0
Humby, Lewis W.	0	5	0
Madge, James C.	0	10	6
Mumford, Alfred	0	10	6
Powell, Edward	1	1	0
Randall, William B.	1	1	0
Rubie, J. T.	0	5	0
Spearing, James	0	10	6
Wedge, George D.	0	2	6
Southborough.			
Rogers, Oliver	0	5	0
Southend.			
Dawson, George R.	0	5	0
South Molton.			
Swingburn, Richard H.	0	10	6
Southport.			
Adams, C. M.	0	5	0
Ashton, William	1	1	0
Ball, Henry	0	5	0
Elliott, Stephen J.	0	2	6
Gill, Hugh	0	5	0
Goddard, B.	1	1	0
Hay, David	0	5	0
Horsefall, John	0	10	6
Loadman, James	0	5	0
Mainwaring, R.	0	10	6
Neame, H. A.	0	2	6
Radley, William V.	0	10	6
Righton, James	0	10	6
Round, Frederick	1	1	0
Surr, Edward	0	10	6
Whitworth, James	0	10	6
Wilding, G. J.	0	10	6
Wimpenny, James M.	0	5	0
Winter, William	0	10	6
Southsea.			
Adams, George	2	2	0
Callaway, L.	0	10	6
Childs, James L.	0	10	6

Southsea—continued.	£	s.	d.
Cruse, Thomas H.	1	1	0
Deacon, F. G.	0	5	0
Ford, H. S.	0	5	0
Sangster, John G.	0	5	0
Trist, R.	0	5	0
South Stockton.			
Ronchetti, T. A.	0	5	0
Southwell.			
Downing, J. H.	0	5	0
Southwold.			
Critten, Robert P.	0	2	6
Spalding.			
Asling, Brelsford	0	5	0
Bell, E. W.	0	5	0
Branston, J. W.	0	5	0
Donington, R.	0	5	0
Holland, J. (Pinchbeck West)	0	5	0
Holland, John	0	5	0
Steeper, Samuel	0	5	0
Spennymoor.			
Burden, Thomas A.	0	5	0
Spilsby.			
Rainey, J. J.	0	5	0
Robinson, —	0	5	0
Stafford.			
Averill, Henry Alcock	0	10	6
Averill, John	0	10	6
Stamford.			
Dickinson, Frederick	0	10	6
March, Frederick	0	5	0
Stevenage.			
Fresson, Lewis Francis	0	10	6
Stoke Ferry.			
Newsam, W. H.	0	5	0
Stockport.			
Arnfield, J. C.	0	5	0
Dodge, William	0	10	6
Goddard, Joseph	0	5	0
Johnson, Thomas J.	0	5	0
Kay Brothers	2	2	0
Orton, W. B.	0	5	0
Sidley, Thomas I.	0	10	6
Towle, Samuel	0	5	0
Stockton-on-Tees.			
Bainbridge, Robert R.	0	2	6
Stoke-on-Trent.			
Adams, Frank	0	10	6
Adams, William H.	0	10	6
Guest, George C.	0	2	6
Harris, Robert H.	0	5	0
Jones, John	0	10	0
Smith, Arthur H.	0	10	6
Wilson, Clement Fisher	0	10	6
Stoke (Surrey).			
Ratheram, William	0	5	0
Stone (Staffs).			
Slater, Thomas	0	10	6
Slater, Thomas, jun.	0	5	0
Stonehouse (Devon).			
Davey, H. D.	0	2	6
Netten, Henry J. T.	0	5	0
Stony Stratford.			
Cox, Julia Jane	0	10	6
Robinson, William H.	0	10	6
Stourbridge.			
Bland, T. F.	0	10	6
Burgess, William	0	5	0
Clark, Thomas P.	0	5	0
Loverock, Henry	0	5	0
Selleck, W. R.	0	10	0
White, John T.	0	5	0
Stourport.			
Twinberrow, T.	0	10	6
Stowmarket.			
Gostling, George J.	1	1	0
Simpson, Robert G.	0	5	0
Wilson, Thomas	0	5	0
Stradbroke.			
Foulsham, Harry B.	0	5	0

Stratford-on-Avon.	£	s.	d.
Ashfield, A.	0	5	0
Stratton.			
Pickard, Henry	0	5	0
Strood.			
Picnot, Charles	1	1	0
Stroud.			
Coley, Samuel J.	0	10	6
Sudbury-on-Thames.			
Price, J.	0	5	0
Sunderland.			
Aslin, John	0	5	0
Aslin, William	0	2	6
Fairman, George P.	0	10	6
Harrison, John	0	10	6
Harrison, W. B.	0	5	0
Leadbitter, W. W.	0	2	6
Mitchinson, John	0	5	0
Ranken, Charles	0	5	0
Surbiton.			
Acfield, William	0	5	0
Lowe, Charles	0	10	0
Sutton (Cheshire).			
Dangerfield, W. H.	0	5	0
Sutton-in-Ashfield.			
Briggs, G. W.	0	5	0
Swaffham.			
Bell, Frederick R.	0	10	6
Christopherson, Fred	0	5	0
Finch, Jacob	0	10	6
Swansea.			
Agar, J.	0	5	0
Atkins, John	0	5	0
Davies, J. M.	0	5	0
Davies, John (31, High Street)	0	5	0
Davies, John (75, Oxford Street)	0	2	6
Davies, John (Walters Road)	0	5	0
Davies, William	0	5	0
Evans, D.	0	2	6
George, William	0	10	6
Grose, Nicholas M.	1	1	0
Hughes, James	0	5	0
Jones, Moses	0	10	6
Keall, F. P.	0	10	6
Lloyd, John W.	0	5	0
Lowther, H. R.	0	5	0
Owen, D. J.	0	2	6
Rees, Daniel	0	5	0
Richards, J.	0	5	0
Roberts, J. K.	0	5	0
Spencer, —	0	2	6
Trick, M.	0	5	0
Williams, J. T.	0	10	6
Yorath, C.	0	5	0
Swindon.			
Green, John	0	5	0
Tarporley.			
Aston, Walter	0	5	0
Taunton.			
Copestake, H. H.	0	5	0
Gregory, George H.	0	5	0
Hambly, Charles J.	0	5	0
Kirkpatrick, Mrs.	0	5	0
Sargent, John C.	0	10	6
Symons, W.	0	5	0
Tavistock.			
Doble, H. T.	0	5	0
Gill, William	0	2	6
Teignmouth.			
Cocking, Frederick J.	0	5	0
Cornelius, Joseph	0	5	0
Evans, Joseph J. O.	0	5	0
Maunder, William	0	5	0
Tenbury.			
Slade, John	0	10	6
Tenby.			
Davies, Moses P.	0	5	0
James, George	0	5	0
Williams, William	0	10	6
Tewkesbury.			
Barlow, G. R.	0	2	6
Wilkes, D. T. (Bredon)	0	2	6
Wilson, John H.	1	1	0

Thame.	£	s.	d.
Tame, Thomas	0	5	0
Thirsk.			
Ayre, George	0	10	6
Ayre, Henry	0	2	6
Thornhill (N.B.).			
Fingland, James	0	5	0
Thornton Heath.			
Knott, Samuel	0	5	0
Thrapston.			
Pars, R. C.	0	10	6
Ticehurst.			
Corke, Edward	0	10	6
Titchfield.			
Smith, W. O.	0	10	6
Tiverton.			
Havill and Son	0	5	0
Reeves, W. R. (Pool Anthony)	0	10	0
Rossiter, Thomas E.	0	5	0
Tritton, C. E.	0	5	0
Todmorden.			
Maddock, H.	0	5	0
Stevenson, W.	0	2	6
Topsham.			
Ellis, Frederick	0	2	6
Torquay.			
Bathe, William	0	5	0
Bridgman, William Louis	0	5	0
Cocks, John W.	0	5	0
Guyer, James B.	0	10	6
Horton, Thomas	0	5	0
Ingle, G.	0	5	0
Knight, Benjamin	0	5	0
Moon, G. W.	0	10	6
Ness, Thomas H.	0	5	0
Shapley, Charles	0	10	6
Sloman, Richard	0	10	6
Stammwitz, Louisa	0	10	6
Taylor, John	0	10	6
Tomlin, J. P.	0	5	0
Waymouth, T. S.	0	5	0
Totnes.			
Butland, Charles	0	5	0
Cooke, E. H.	0	2	6
Morse, C. H. Stafford	0	5	0
Tredegar.			
Phillips, Charles L.	0	10	6
Truro.			
Anstey, J. U.	0	5	0
Bucher, W. H.	0	5	0
Feaver, Samuel	0	10	6
James, Hamilton	0	5	0
Newby, Richard I.	0	10	6
Percy, Thomas B.	0	10	6
Tunbridge.			
Gower, Alfred	0	5	0
Millidge, Thomas E.	0	10	6
Wardley, S. F.	0	10	6
Tunbridge Wells.			
Arnold, Spencer	0	10	6
Batting, Thomas G.	0	10	6
Cheverton, George	1	1	0
Dunkley, Edward	0	10	6
Howard, George W.	0	10	6
Howard, Richard	0	10	6
Sells, Robert J.	0	10	6
Whitrow, Benjamin	1	1	0
Williams, James	0	10	6
Tunstall.			
Keightley, Joseph	0	5	0
Tutbury.			
Green, Isaac	0	5	0
Twickenham.			
Alexander, William	0	5	0
Bishop, Thomas	1	1	0
Peake, Henry F.	0	5	0
Shelley, Henry	0	10	6
Tynemouth.			
Atkinson, Joseph	0	5	0
McInroy, James	0	3	0

Uckfield.	£	s.	d.
Farr, E. H.	0	10	6
Ulverston.			
Willan, Robert	0	10	6
Upton-on-Severn.			
Gibbs, John	0	10	6
Urmston.			
Duncalf, Richard	0	5	0
Uttoxeter.			
Parker, Alfred	0	5	0
Woodward, H.	1	1	0
Woolrich, Charles B.	0	10	6
Uxbridge.			
Chadwick, G. W.	0	5	0
Ventnor (Isle of Wight).			
Littlefield, J. W.	1	1	0
Nicholls, A. L.	0	2	6
Smith, C. A.	1	1	0
Weston, Charles	1	1	0
Wadebridge.			
Philp, J.	0	5	0
Wakefield.			
Cardwell, James	0	5	0
Chaplin, John Lambert	0	10	6
Duffin, Thomas	0	10	6
Moorhouse, Walter	0	5	0
Pollard, William	0	5	0
Saville, George	0	10	6
Smith, G. E.	0	10	6
Thornton, E.	0	5	0
Wice, J. H.	0	10	6
Wallingford.			
Ashmall, George	0	5	0
Payne, Sidney	1	1	0
Upton, Eustace J.	0	10	6
Wallington.			
Baker, W. R.	0	5	0
Wood, Edward	0	10	6
Walmer.			
Wood, Henry	0	5	0
Walsall.			
Bayley, C.	0	10	6
Elliott, George	0	5	0
Grove and Son	0	5	0
Highway, M. H.	0	10	0
Morris, J. O.	0	5	0
Newton, A. G.	0	5	0
Shilton, J.	0	5	0
Thorp, J.	0	2	6
Walsham-le-Willows.			
Harrington, Arthur	0	5	0
Waltham.			
Teat, Thomas	0	5	0
Waltham Abbey.			
Griffiths, J. M.	0	10	6
Marshall, A.	1	1	0
Walton-on-Thames.			
Davies, C. E.	0	5	0
Power, William	0	10	6
Ware.			
Medcalf, Benjamin	0	10	6
Medcalf, Benjamin Pearce	0	10	6
Wareham.			
Harman, E. S.	0	5	0
Marshallsay, R. J.	0	5	0
Randall, Thomas	0	10	6
Warminster.			
Toone, A. H.	0	10	0
Warrington.			
Greenough, H. F.	0	2	6
Young, John R.	0	10	6
Watchet.			
Daymond, Samuel	0	2	6
Watford.			
Chater, Edward M.	1	1	0
Chater, Matthew Taylor	1	1	0
Cottle, Alfred James	0	5	0
Maries, H. D.	0	5	0
Parrott, W. S.	0	10	6

Wath-upon-Dearne.	£	s.	d.
Hick, Allan	0	10	6
Watton.			
Pechey, T. P.	0	5	0
Vincent, Lacey A.	0	10	6
Weaverham.			
Manifold, John J.	0	10	0
Wednesbury.			
Gittoes, Samuel J.	0	10	6
Wellingborough.			
Smith, John T.	0	2	6
Woolston, Thomas Henry	0	15	6
Wellington (Somerset).			
Gregory, Walter	0	5	0
Windeatt, G. J.	0	5	0
Wells (Norfolk).			
Rump, Robert R.	0	10	6
Wells (Somerset).			
Manning, Richard James	0	10	6
Slater, Jonathan	0	5	0
Welshpool.			
Griffiths, Thomas	0	5	0
Welton.			
Myers, George Henry	0	5	0
West Bromwich.			
Bullus, John	0	5	0
Westbury.			
Paine, Charles	0	2	6
Westgate-on-Sea.			
Bessant, Frederick R.	0	10	6
West Malling.			
Stedman, Richard B.	0	5	0
Stedman, Walter	0	2	6
Weston-super-Mare.			
Cooper, John	0	5	0
Duckett, F. W.	0	10	6
Organ, E.	0	5	0
Parkes, Harry C.	0	10	6
Pumphrey, Arthur	0	5	0
Weybridge.			
Griffin, Thomas	0	10	6
Weymouth.			
Gregory, W.	0	5	0
Groves, Thomas B.	0	10	6
Targett, Charles G.	0	5	0
Whitby.			
Corner, Thomas B.	0	10	6
Frank, John	1	1	0
Stevenson, John	0	10	6
Whitehaven.			
Wilson and Kitchin	1	1	0
Whitley (Yorks).			
Whitehead, G.	0	2	6
Wick (N.B.).			
Miller, Kenneth	0	5	0
Wigan.			
Dawson, F. R.	0	5	0
Eckersley, M.	0	5	0
Johnson, Thomas	0	10	6
Kellett, Richard E.	0	5	0
Phillips, Jonathan	0	5	0
Wimbledon.			
Cave, J. R.	0	2	6
Day, Thomas S.	0	10	6
Dowdeswell, Jonathan	0	5	0
Pooley, John D. S.	0	10	6
Spencer, W. G.	0	5	0
Wimborne.			
Gossling, W. R.	0	5	0
Winchester.			
Barratt, F. J.	0	5	0
Bolton, Edgar B.	0	5	0
Knight, George E. Moses	0	5	0
Powell, Edward F.	0	10	6
Winchfield.			
Machin, W. G.	0	5	0
Windsor.			
Collins, Henry G.	0	5	0
Grisbrook, Edward	0	5	0
Harmer, J. D.	0	5	0
Russell, Charles J. L.	0	10	6
Wood, Robert	0	5	0
Wingate.			
Cross, John T.	0	10	6
Wingham.			
Palmer, Henry B.	0	5	0
Winshill.			
Green, W.	0	2	6
Winslow.			
Parrett, Edward	0	5	0
Wisbeach.			
Oldham, Elizabeth S.	0	2	6
Witham.			
Green, Robert P.	0	10	6
Witney.			
Purdue, Thomas	0	5	0
Wokingham.			
Spencer, Thomas	0	10	6
Wolverhampton.			
Burnett, C.	0	5	0
Cannell, William	0	10	6
Fleeming, W.	0	5	0
Gibson, F. J.	0	10	6
Godsell, P. G.	0	5	0
Hamp, John	0	5	0
Stanway, Edward Thomas	0	10	6
Weaver, Alfred C.	0	10	6
Woodbridge.			
Betts and Son	0	5	0
Woolston (Hants).			
Pell, John	0	5	0
Worboys.			
Nichols, Arthur F.	0	5	0
Worcester.			
Addis, T. J.	0	2	6
Coles, A.	0	5	0
Ferneley, Charles	0	10	6
George, Henry	0	10	6
Hall, Frederick J.	0	5	0
Hinks, John	0	10	6
Horniblow, W. T.	0	5	0
Judson, T. B.	0	2	6
Kitson, E. J.	0	5	0
Silk, Thomas	0	5	0
Steward, John A.	1	1	0
Thornton, William	0	2	6
Virgo, Charles	1	1	0
Workington.			
Mason, Joseph R.	0	5	0
Worksop.			
Baxter, George	0	5	0
Jones, George W.	0	5	0
Worthing.			
Berry, H. J.	0	2	6
Burt, James	0	5	0
Cortis, A. B.	0	10	0
Frost, William	0	10	0
Gulliver, W. I.	0	10	6
Wyke.			
Drake, William	0	5	0
Wymondham.			
Skoulding, William	0	5	0
Yarm.			
Reed, George	0	5	0
Yarmouth.			
Arthur, John	0	5	0
Clows, John E.	0	10	6
Mornement, H. J.	0	5	0
Poll, W. S.	0	2	6
Pratt, Edward J.	0	5	0
Steward, Alfred	0	5	0
Williams, C. E.	0	2	6
Yaxley.			
Farr, Joseph	0	10	6
Yeadon.			
Blatchley, Thomas	0	10	6
York.			
Batty, Thomas	0	10	6
Coates, Henry	0	5	0
Parker, Thomas	0	10	6
Saville, John	1	1	0
Sowray, J.	0	5	0
Wisker, R. H.	0	2	6
York Glass Co.	1	1	0

ANONYMOUS DONATIONS AND SUBSCRIPTIONS.

	£	s.	d.
S. J. B.	2	2	0
Remus	0	2	6
X.	0	3	0

"THE MONTH."

Phenylpropionic Acid and Phenylacetic Acid.

The result of the observations made by Dr. Klein and Mr. Lingard upon the effect of phenylpropionic and phenylacetic acids on the virus of tubercle, to which reference has been previously made in this journal (vol. xvi., p. 429), has induced Dr. C. T. Williams, of the Brompton Consumption Hospital, to institute a series of experiments with these compounds on human patients, an account of which appears in the *Practitioner* (February, p. 100). Phenylpropionic acid ($C_9H_{10}O_2$) is described as occurring in acicular crystals of reddish white colour, insoluble in water, but soluble in spirit (1 in 6), and having a feebly acid reaction. The solution has a not unpleasant sour aromatic taste, and the aroma often pervaded the air of the ward. The alcoholic solution was administered in 10 minim doses diluted with an ounce of water, which were generally increased to 20 minims in two ounces of water, three times a day. Twenty patients suffering from phthisis in different forms and stages were treated for periods varying from 28 to 85 days. As a rule the medicine caused neither nausea, vomiting nor anorexia, except in two cases in which the nausea was overcome by further diluting the medicine with water. After administration the peculiar odour could not be detected in perspiration, urine or fæces. As a result of the treatment thirteen cases improved, four remained stationary and three became worse, and it was inferred that phenylpropionic acid exercises more influence on suppuration than on tuberculization. Neither the amount of expectoration nor the cough was decreased, but in the improved cases there was decided increase of appetite, and gain of weight, colour and vigour. Phenylacetic acid resembles phenylpropionic acid closely in taste, but has a more acid reaction. It dissolves in alcohol (1 in 6), and in this condition is taken up by a small quantity of water. The alcoholic solution was given in doses of 10 to 20 minims three times a day, to nineteen cases of phthisis, for periods ranging from twenty-one to eighty-nine days, and in no case gave rise to unpleasant symptoms. The odour of the compound was perceptible in the ward, but not in the patient's breath or excretions. Of these cases thirteen improved greatly, four deteriorated, and three remained stationary, the improvement consisting in gain of weight, strength and colour, partly due to diminution of cough and expectoration. From the general results of the experiments with the two compounds, Dr. Williams concludes that phenylpropionic and phenylacetic acids given in phthisis promote appetite, digestion and assimilation, and are well tolerated in considerable doses; also that the use of phenylacetic acid is more indicated in cases of tuberculization and that of phenylpropionic acid in excavation cases.

Salol and Cholera.

Notwithstanding the eager interest that attended the announcement some time ago of the discovery of the cholera bacillus, extended observations brought out so much that appeared inexplicable on the assumption that this organism was the sole provoking cause of cholera that Dr. Koch's views failed to gain universal acceptance. It would appear probable however that an important contribution to the further history of the subject has been made in a recent communication to the Academy of Sciences (*Compt. Rend.*, cvii., 1169). M. Loewenthal seems to have observed that specimens of the cholera bacillus which when fresh possessed toxic properties, lost them after cultivation in peptonized broth and similar media, so that they were then inert when injected into white mice, though these animals are susceptible to the cholera virus. This he explained by the assumption that under these conditions the bacilli no longer secrete the poisonous ptomaine to which the symptoms of cholera are due, and in experimenting as to the manner in which the original action of the bacilli could be restored, he found that this could be effected by cultivating them in a paste containing pancreatic juice. He inferred therefore that probably cholera bacilli pass through the stomach harmless, but commence the secretion of the poisonous ptomaine when they come under the influence of the pancreatic secretion, which is consistent with the observation that the cholera bacilli are found in the intestines. Seeking a suitable substance that could be used in the treatment of cholera according to this theory, M. Loewenthal believes that such a one is available in salol, which is understood to specially exercise its antiseptic property in the organism after decomposition through contact with the pancreatic liquid. Laboratory experiments showed that salol will kill cholera bacilli already developed in a paste containing pancreatic juice, and that its addition to a paste before the sowing of the bacilli will render the paste sterile. Further, having proved the innocuousness of salol by himself taking two five-gram doses in one day, M. Loewenthal urges that a practical test should be made, when opportunity occurs, as to the value of this compound in the treatment of cholera.

Cresol Salicylates.

The publication of the paper referred to in the preceding paragraph evoked a suggestion from Dr. Nencki, whose name is closely associated with salol, that still better agents for combating the cholera bacillus might be available in the salicylates of cresol. By a process analogous to that adopted in the manufacture of salol it is possible to prepare from cresol three isomeric crystalline salicylates, which are insoluble in water and soluble with difficulty in cold alcohol, and have a pleasant odour, resembling that of salol, but not so strong. The salicylate of orthocresol melts at 35° C., that of metacresol at 74° C., and that of paracresol at 39° C. The orthocresol compound produces upon the tongue a slight burning sensation, whilst the paracresol compound is quite tasteless. These compounds are said to possess the same antiseptic properties as salol. In the organism they are split up into their constituents, the respective cresol and salicylic acid, not only by the pancreas, but by the other organs; in the case of the paracresol compound the paracresol is eliminated for the most part in combination with sulphuric acid and a part is oxidized to parabenzoic acid. It is stated that 16 grams of paracresol salicylate was given in four doses of 4 grams each in twenty-four hours to a dog weighing 16 kilograms without producing more than a temporary malaise, and it is affirmed that it is equally well tolerated by human beings.

Another instance of the important influence of surrounding conditions on the action of micro-organisms is furnished in an account by Dr. Baginski of his researches on the bacteria that occur

Bacterium Coli and B. Lactis.

in the fæces of children fed on milk. (*Nature*. Feb. 21, p. 407). One of these is the *Bacterium coli*, which when sown in a simple solution of milk sugar produces no change, but if there be an admixture of white of egg fermentation is set up, either with or without the access of air, the products being lactic, acetic and formic acids. The other bacterium occurring in such fæces, *B. lactis*, was found not to induce a lactic, but an acetic fermentation of milk sugar, and Dr. Baginski suggests that the species would therefore be more appropriately named *Bacterium aceti*. Both species were found to exercise an influence antagonistic to the development of alkaline fermentation or decomposition.

Terpene and Menthene.

In an interesting communication to the Academy of Sciences (*Compt. Rend.*, cvii., 916), Messrs. Bouchardat and Lafont have placed on record the stages of the conversion of terpin ($C_{10}H_{16}\cdot H_2O$) into menthene ($C_{10}H_{18}$) and probably menthyl chloride ($C_{10}H_{19}Cl$). Upon treating terpin with about twenty times its weight of saturated aqueous hydriodic acid, a crystalline dihydriodate of terpene was formed immediately ; but as the temperature rose the compound liquefied and formed a layer on the top, and part of the iodine was liberated, leaving the hydrogen combined with the organic compound according to the equation—

$$C_{10}H_{16}\cdot 2HI + HI = C_{10}H_{18}HI + I_2.$$

At the same time a partial polymerization of the terpilene took place, with formation of diterpilene ($C_{20}H_{32}$). But the principal product was an iodized compound, isomeric, if not identical with the hydriodic ether of menthol ($C_{10}H_{19}I$), which could not, however, be separated undecomposed from the diterpilene. The mixture was therefore heated with alcoholic solution of potassium acetate, and after deposition of the resulting alkaline iodide treated with water, when a very aromatic oily layer formed on the top. This was fractionated, and the portion passing over between 167° and 170° C. proved to be a stable hydrocarbon having the composition of menthene ($C_{10}H_{18}$). This compound combined with only one equivalent of hydrochloric acid to form an agreeably smelling oil liquid, not solidifying even at—60° C., which seemed to be identical with the hydrochloric ether of menthol, or menthyl chloride ($C_{10}H_{19}Cl$) which is formed also when menthol is treated with hydrochloric acid or phosphoric chloride.

Hydrazin and its Salts.

The interesting diamid hydrazin, and some of its compounds, form the subject of an important paper in the *Journal fiir praktische Chemie* (Jan., p. 27). This compound, which is represented by the formula N_2H_4 or $\begin{matrix}NH_2\\|\\NH_2,\end{matrix}$ is obtained in the decomposition of triazoacetic acid by heating it with water or mineral acids, six molecules of water being taken up and hydrazin and oxalic acid being formed.

$$\underset{\text{Triazoacetic acid.}}{C_3H_3N_6(COOH)_3} + 6H_2O = 3\underset{\text{Hydrazin.}}{N_2H_4} + 3C_2H_2O_4.$$

The oxalic acid is more or less split up, according to the temperature or strength of the acid employed, into carbonic and formic acids, so that when only water is used the hydrazin separates as a formate, but if a mineral acid be present it forms the corresponding salt. The physical properties of free hydrazin are as yet unknown ; most probably it is a gas or a liquid with a low boiling point. It has an extraordinary affinity for water, readily forming a hydrate, $N_2H_4\cdot H_2O$, which it does also when set free from its salts by oxides or hydrates of the alkalies. This hydrate is a liquid fuming in air that boils unaltered at 119° C., and can be easily separated from water by distillation ; but attempts to decompose it into hydrazin and water by the agency of barium hydrate failed. It has an alkaline taste and leaves a burning sensation on the tongue : when boiling it attacks glass and quickly destroys corks and india-rubber. Hydrazin combines with one or two molecules of monobasic acids to form very stable salts, usually crystalline and isomorphous with the corresponding ammonium salts, which in acid solution possess extraordinarily strong reducing properties and are powerfully toxic towards the low organisms. The bichlorhydrate crystallizes from water in large glassy octahedra that are freely soluble in water and melt at 198° C. under evolution of hydrochloric acid gas to a clear glass consisting of the monochlorhydrate, and this on further heating to 240° C. is decomposed into ammonium chloride, nitrogen and hydrogen.

Sugar from Formic Aldehyd.

The work of Professor Emil Fischer and his colleagues upon the synthetical formation of sugar has now arrived at a stage when it promises to throw an interesting light upon the formation of sugar in plants. It will be remembered that by the condensation of glyceric aldehyd, or better by condensation of the product of decomposition of acrolein bromide, Messrs. Fischer and Tafel obtained the phenylhydrazin compounds or osazones of two substances that were thought to be of the nature of sugars, and were named α-acrose and β-acrose (*Pharm. Journ.*, [3], xviii., 402). An improved method of separating sugars in which, upon treatment with hydrochloric acid, the phenylhydrazin is removed from an osazone, leaving an oxidation product of the sugar that can be easily reduced, allowed of the determination that α-acrose corresponds with glucose in every respect except in being optically inactive (*Berichte*, Jan. 28, p. 98). In a still more recent communication (*Berichte*, Feb. 25, p. 359), Messrs. E. Fischer and F. W. Passmore report that among the products of the condensation of formic aldehyd they have met with a sugar that is identical in every respect with α-acrose. This observation is interesting, as being confirmatory of Professor Baeyer's theory that glucose is formed in plants by the reduction of carbonic acid to formic aldehyd and the condensation of this product.

Meconarceine and Narceine Meconate.

A preparation that has been recently introduced under the name of "meconarceine" has been examined and reported upon by E. Merck (*Pharm. Zeit.*, Feb. 6, p. 90). It is described as occurring in commerce as a neutral yellow solution, enclosed in glass tubes, under the designation, "Solution sterilisée et titrée d'alcaloides meconarcéiques." It is stated that upon opening a tube a strong smell of camphor was observed, the camphor having been probably added for the purpose of sterilization. The total alkaloids equalled 0·005 gram in each cubic centimetre, of which from one-third to one-half was codeine and there was a smaller quantity of narceine. The bases were com-

bined with an acid soluble in ether that was not identified, and meconic acid was not found. Another German preparation that occurs in commerce, sometimes as "meconarcein" and sometimes as "narceine meconate," is described as a white powder consisting of a mechanical mixture of meconic acid and narceine, having a melting point at 110° C. When this powder is dissolved chemical combination takes place, and the product after recrystallization melts, with evolution of gas, at 126° C., which is the melting point of acid meconate of narceine. Herr Merck points out that as narceine is monovalent as a base, while meconic acid is a bibasic acid, a neutral meconate of narceine would contain two molecules of the alkaloid to one of the acid. But he states that upon attempting to prepare such a compound there is first a separation of yellow needles and then one of white scales, the needles being richer in meconic acid than the scales, and that a homogeneous product is obtainable only in the proportion of a molecule of alkaloid to one of acid. A meconate of narceine so prepared is described as being of a lemon yellow colour, tolerably soluble in boiling water, difficultly soluble in strong alcohol, and most soluble in 50 per cent. spirit.

Eschscholtzia Californica.

The announcement recently of the occurrence in the *Eschscholtzia californica* of an alkalcid agreeing in all its characters with morphine has furnished another illustration of the tendency of botanically allied plants to elaborate compounds of similar chemical composition. But besides a small quantity of morphine, Messrs. Adrian and Bardet have reported the presence in the plant of a more considerable quantity of another undescribed base as well as indications of a glucoside, and this is consistent with the observation that an extract from the plant produces in cold-blooded animals a physiological effect not brought about by morphine even in large doses (*Bull. Thérap.*, Jan. 15, p. 21). A number of physiological experiments upon animals with an aqueous and an alcoholic extract of the plant, together with the results of the use of the extracts on patients in the Cochin hospital, are reported upon by Dr. Ter-Zakariant. He is of opinion that the plant yields a very valuable soporific preparation, which is useful in certain cases as an anodyne, whilst it is free from the inconveniences attending the administration of morphine.

Picrotoxin and Morphine.

According to the results of some experiments carried out by Professor Bokai, picrotoxin would be the most rational antidote to use in cases of morphine poisoning (*Apot.-Zeit.*, Feb. 6, p. 139). The two compounds were found to act antagonistically to each other on the respiration centre and the spinal cord, small doses of picrotoxin preventing the paralysis of the respiration caused by morphine, or removing it when it had become manifest. The rapid falling of the blood pressure, which is so dangerous a symptom in morphine poison, is also counteracted by the strongly stimulating action of picrotoxin upon the vessel-contracting centre of the medulla oblongata.

Condurango Bark.

Further information respecting the active principles of condurango bark (*Gonolobus Condurango*) has now been published by Professor Kobert (*Pharm. Zeit.*, Feb. 16, p. 113). It appears that the bark contains at least three active substances, probably two or three glucosides and a resin, all of which manifest the same action qualitatively, so that a mixture of them might be used. The "condurangin" of Dr. Vulpius (see before, Dec. 29, p. 506) turns out in fact not to be a homogeneous substance, but a mixture of two of these glucosides. It possesses the interesting physical properties that when heated in aqueous solution it coagulates like albumen, even at 40° C., and that like albumen it is precipitated from an aqueous solution by sodium chloride. An aqueous solution, after being boiled and filtered, contains hardly any "condurangin." This substance exerts a decidedly poisonous action on the central nervous system. With small doses the action is manifested in a remarkable ataxic change of gait, which presents a similarity to that in cases of tabes dorsalis. The poison also appears to act upon the peripheral nerves and muscles, at first increasing and then depressing the electric excitability of those organs. Loss of desire to eat is a constant symptom of the poisoning and with mammals in the earlier stages there is a plentiful flow of saliva as well as vomiting. The lethal dose of conduragin for carnivorous animals is 0·02 gram per kilo of body weight, and for herbivorous animals about three times as much. It has not yet been ascertained whether conduragin exercises any specific influence upon carcinoma cells.

Acacia anthelmintica.

In Abyssinia the bark of the *Acacia anthelmintica* is used as a taenicide by the natives, by whom it is alleged to be more effective for the purpose than kousso, whilst less disagreeable in taste (*Bull. Comm.*, Jan., p. 36). A powder of the bark is mixed with flour used for making bread; it is also taken mixed with butter or honey, and as a strong infusion. According to M. Thiel it contains a substance resembling saponin in its chemical properties, which he has named "moussenin."

Senecio canicida.

The physiological action of *Senecio canicida*, a composite plant, native of Mexico, and used, as its name implies, to poison dogs, has been investigated by M. Debiérre. The active principle of the plant is more abundant in the root than in the leaves. Three stages occur in the poisoning arising from its use, viz., a period of excitation, then one of rest, and lastly of spasm. The temperature rises and remains high until the animal dies, death taking place from paralysis of respiration; the pupil of the eye is dilated, and the blood becomes black and fluid, and the membranes of the brain are found to be congested. Whilst the poison paralyses the sphincters of the bladder and rectum, it irritates the involuntary muscles of the intestines, bladder, and iris. Although it causes tetanic symptoms like those of strychnine, it differs from that alkaloid in lowering reflex excitability (*Archiv*, Feb., p. 130).

Sanguisorba officinalis.

The *Pharmaceutische Post* (p. 109) records a case of chronic stomachic catarrh with heartburn of a year's standing which was cured by the use of an infusion of the flowers of *Sanguisorba officinalis*. The use of the plant for this purpose is by no means new, but is only a resurrection of an old domestic remedy, upon the cause of the value of which a chemical investigation might perhaps throw some light.

A case of poisoning resulting from swallowing a teaspoonful of oil of sassafras has been lately

Poisoning by Oil of Sassafras.

reported in the United States by Dr. Allright (*Therap. Gaz.*, Jan., p. 66). The symptoms produced were hallucinations within half an hour, followed within the hour by vomiting and unconsciousness. In two hours after taking it the extremities were cold, the radial pulse could be detected only with difficulty, and the pupils were dilated. The patient recovered next day after the use of stimulants, the greater part of the oil having been vomited. It would be interesting to know to which of the constituents of the oil of sassafras the symptoms were due, since the depressing effect of the oil upon the heart seems to be present in a very much greater degree in the oil of the Australian sassafras (*Atherosperma moschatum*).

Among the optical disturbances known to follow the administration of sodium santonate is the loss

Sodium Santonate.

of perception for violet, a form of colour-blindness that is never congenital. In some personal experiments with the compound, Dr. A. König has found (*Nature*, Feb. 21, p. 408) that apart from the fact that as soon as its action is established all objects appear of a yellow colour, the spectrum ceases to be visible on the hinder side of the blue, not a trace of violet ever being perceptible ; the neutral point is situated at wave-length 573, or exactly at the point which is complementary to the missing violet. Dr. König infers therefore that the visual phenomena observed after the administration of sodium santonate are not really of the nature of colour blindness to violet, but may be explained on the assumption that the violet rays are absorbed by those media of the eye that have become affected by the drug.

Eserine sulphate has recently been recommended by Dr. Reiss, in the form of hypodermic injec-

Eserine Sulphate.

tion, for the relief of chorea, $\frac{1}{64}$ of a grain being injected twice daily. He states that in a number of cases cure followed after five or six days treatment, although in aggravated forms of the disease occurring in adults the success was not so marked. He adds that the results obtained from the same remedy were satisfactory in the treatment of tetanus, paralysis agitans, spinal sclerosis, and in a case of hysteria in a man, accompanied by great excitement and remarkable increase in reflex movements (*Therap. Gaz.*, p. 69).

If dilute sodium hypochlorite solution be added drop by drop, with stirring, to a solution of 50

Iodoform Manufacture.

grams of potassium iodide, 6 grains of acetone and 3 grams of caustic soda in one or two litres of water, iodoform separates at once and continues to do so until either the acetone or the iodide has disappeared. The reaction is possibly expressed by the equations—

$$KI + KClO = KIO + KCl$$
$$3KIO + C_3H_6O = CHI_3 + KC_2H_3O_2 + 2KOH.$$

The precipitation of the iodine is not affected by the presence of the most diverse neutral alkali salts, and upon this fact Messrs. Suilliot and Raynaud have based a method of working varec (*Chem Zeit.*, Jan. 16, p. 32). The ash-ley is first freed from some sulphides, sulphates, etc., it contains, after which the amount of iodine present as iodide is determined and an equivalent quantity of acetone added and then sodium hydrochlorite is poured in gradually as long as any precipitate is formed. When subsidence is completed the liquor, which then contains only traces of iodine, is decanted off and evaporated for potassium salts in the usual way.

Thioresorcin has been suggested as a substitute for iodoform, it being credited with properties of

Thioresorcin.

disinfecting and promoting the healing of wounds, whilst it has the advantage of being odourless (*Apot.-Zeit.*, Feb. 23, p. 212).

A delicate test to distinguish between tannic and gallic acids consists, according to Mr. Rawson, in

Tests for Tannic and Gallic Acids.

treating an aqueous solution of either of them with a solution containing ammonium chloride and free ammonia (*Chem. News*, Feb. 1, p. 52). If a solution of tannic acid be treated with ammonium chloride only, a precipitate is formed, though very slowly; but when ammonia as well is added there appears immediately a beautiful white precipitate, that becomes rapidly reddish-brown, probably through oxidation. Even in very dilute solutions (1 in 5000 or more), if the mixture of ammonic hydrate and chloride be dropped cautiously on the surface of the solution, the white precipitate makes its appearance at once in a well-marked line where the two liquids come into contact with one another. With gallic acid, either in a strong or weak solution, similarly treated, no precipitate is formed, but a ring, usually of a greenish colour, is produced on its lower surface, recognizable in a solution of 1 in 100,000, and the liquid becomes red.

According to the results of some experiments made by Messrs. Dalche and Villejean to deter-

Toxicity of Bismuth.

mine the physiological properties of bismuth (*Bull. Comm.*, Jan., p. 4), the subnitrate becomes a poison when introduced into the annual economy by means of subcutaneous injections. When introduced into the stomach bismuth subnitrate is absorbed with great difficulty and therefore remains harmless; but when introduced under the skin it is considered that the bismuthic oxide forms a soluble proteic compound, the absorption of which, although slow, being continuous, sets up the toxic action. The symptoms and lessons observed were of the same order as those that follow the ingestion of lead or mercury, varying from them only in intensity, and differing widely from those following chronic poisoning due to the absorption of arsenic or antimony.

The "grey oil," which has recently come into some prominence on the continent as a vehicle for

Grey Oil.

the subcutaneous injection of mercury, requires in its preparation, as ordinarily carried out, a considerable expenditure of time and labour to effect the complete extinction of the metal. M. Vigier suggests a modified method, which he says requires only a quarter of an hour (*L'Union Pharm.*, Feb. 15, p. 49). It consists in triturating in a warm mortar solid white vaseline, 2·5 gram, mercurial ointment (Codex) 1 gram, and mercury 19·5 gram, until the mercury is extinguished, then adding 7 grams of solid white vaselin, and 20 grams of liquid vaselin. The preparation is said to be sufficiently liquid and contains 40 per cent of mercury.

In a letter in the *Gardeners' Chronicle* (Jan. 26, p. 114) Mr. J. Medley Wood, of the Botanical

Aloe ferox. Gardens, Durban, Natal, remarks that the *Aloe ferox*, when undisturbed, is frequently clothed to the base with the dried and stiffened leaves. He adds that these leaves are used by the natives in the manufacture of the snuff of which they are so fond, and are sold for this purpose in most of the Kaffir stores in the town, the natives not considering their snuff to be complete without a proportion of the ashes made by burning the leaves of this plant. A year or two ago one or two bales of these dried leaves were sent to England, presumably for sale to tobacco manufacturers. He further states that "from this plant the greater portion of the Natal aloes is procured, though in some districts no doubt other species are used, the result being, I have reason to believe, an inferiority in the drug." How far Mr. Wood is justified in his inference is open to question, since an excellent aloes is prepared near Pietermaritzburg, from a plant which comes much nearer to *A. platylepis* than to *A. ferox*. The difference in quality is stated by others, who have watched the manufacture both at Port Elizabeth in Cape Colony and near Pietermaritzburg, to be due to the greater or less care taken in the evaporation of the juice. The juice of the *A. platylepis* from Pietermaritzburg, as brought over to this country when evaporated, affords a translucent aloes, very different from the opaque drug known as Natal or hepatic Cape aloes. It is a singular fact that the cause of the opaque appearance in the Natal aloes, as well as in the hepatic aloes from Zanzibar, has never been explained. In the Curaçoa aloes the opacity is known to take place after the arrival in this country, on keeping for several months, and is attributed to the crystallization of the aloin, but this crystallization never seems to take place with the translucent Cape aloes. Perhaps Mr. Wood or some resident at Zanzibar may be able to throw light on the subject.

Burmese Indiarubber. The indiarubber trade on the Chindivin, in Burmah, although it has existed for only about a year, has developed so rapidly that the local government has placed an export duty on the article and imposed a license on all brokers or merchants dealing in it. The rubber is said to be derived from the *Ficus elastica*, the trees being tapped daily from November to June (*Gard. Chron.*, Feb. 16, p. 210).

Use of Secretions to Plants. An interesting investigation made by M. Stahl on use of secretions to plants, published in the *Jenaische Zeitschrift fur Natur. Wiss, und Medicin* (1888), has at length attracted notice in this country, and a useful abstract appears in the *Gardeners' Chronicle* (Feb. 2, p. 144). From this it appears that M. Stahl's experiments lead to the conclusion that many plant secretions are protective. Thus tannin was found to be be objectionable to slugs, slices of carrot dipped in its solution remaining untouched by them. On the other hand, plants containing acid oxalates of potash, such as oxalis, sorrel, rhubarb and begonias were eaten with avidity by slugs when this salt was removed, although previously they would not touch the plants, nor would they attack carrot soaked in a solution of the salt. In the case of helleborus the vegetable poison present appears to act as a protective agent. M. Stahl also points out that the incrustations of carbonate of lime on saxifrages and the silicious coating on grasses and equisetums, and the raphides in plants, have a similar protective duty, since if these be removed, the leaves, etc., are speedily attacked by slugs. He found also that essential oils, such as those of rue, herb Robert and *Acorus Calamus*, are also repulsive to slugs. This idea seems to receive confirmation from the well-known fact that cattle will not touch the common buttercup in its fresh state, although they eat it readily when dried, and that colchicum is always left untouched by them. Nevertheless the peppermint, and occasionally even the aconite (*A. Napellus*), are eaten in London gardens by the common cabbage moth (*Mamestra brassicæ*).

Preservation of the Colour of Dried Flowers. In the *Revue de Botanique* (p. 179) a correspondent states that he has succeeded in preserving the form, beauty, and freshness of flowers by dipping them in a varnish composed of 20 parts of powdered copal dissolved in 500 parts of ether, sand or powdered glass being used to make the resin dissolve more readily. The flowers are dipped in the liquor, carefully withdrawn and allowed to dry for about ten minutes. This is repeated four or five times in succession. A second process given is to immerse the stem of the fresh plant in a solution of 31 grams of alum, 4 of nitre, and 186 of water, for two or three days so that the liquid may be absorbed. The plants are then pressed in the ordinary way, except that dry sand is sifted over the flowers and the packets submitted to a gentle heat for about twenty-four hours. A third process consists in plunging the plant for an instant in a boiling solution of 1 part of salicylic acid in 600 of alcohol (too long an immersion will decolorize violet flowers), and then drying between bibulous paper. For restoring the colour to red flowers which have turned violet or blue in drying a piece of paper moistened with dilute nitric acid (1 part of acid to 10 or 12 parts of water), is placed under the plant, and then the whole submitted to moderate pressure for a few seconds between blotting paper. The amount of pressure and the strength of acid required will vary in different cases, but the green leaves should never be subjected to the acid or they may lose their colour.

Chemical Plant Manure. A correspondent of the *Gardeners' Chronicle* (Feb. 23, p. 246) recommends the following mixture as an excellent application to asparagus beds in addition to the ordinary treatment with animal manure, the quantities here given being for one square yard of surface:—3oz. nitrate of soda, 3oz. potassium chloride, 5oz. superphosphate or basic slag, ground fine, and 1½lb. of common salt.

Icerya Purchasii. A scale insect, *Icerya Purchasii*, has been found to be exceedingly destructive to the orange trees in California, whence it is supposed to have been introduced from Australia, where, probably owing to natural enemies, it is less injurious. Investigations are now being made with a view to the possibility of importing such means of checking the ravages of the insect, since without some such measure it is feared that the Californian orange growers will be ruined. It has been found by a M. Coquillet (*Gard. Chron.*, Feb. 16, p. 209) that the vapour of hydrocyanic acid kills the insects without injuring the trees. The dry gas process recommended by him seems, however, far too dangerous to be capable

of practical application, the gas evolved by the action of sulphuric acid on potassium cyanide and subsequently passed through sulphuric acid being given off as a "dense white vapour." The gas used of this strength is as likely to be fatal to the operator as to the insect.

OBSERVATIONS ON THE USUAL METHODS EMPLOYED FOR MODIFYING THE ALBUMINOIDS OF MILK IN INFANT FEEDING.*

BY T. M. ROTCH, M.D.

Assistant Professor of Diseases of Children, Harvard Medical School; Visiting Physician, Childrens' Hospital.

A great deal has been written, and much stated in every-day practice by physicians, concerning the coagulum which is formed in milk, both human and of the cow. The opinion is held by a number of writers, and very generally believed by physicians at large, that the curd of cow's milk is made finer and to correspond more closely to human milk by means of certain adjuvants, such as lime water and barley water; also that the various cereals, whether in the form of starch, as in bread crumbs, flour, or imperial granum, or in a converted form, as in Mellin's food, possess the property of breaking up, or rather preventing from forming in large curds, the coagulum of cow's milk.

I am at present engaged in a more exact series of experiments on this coagulum, which I hope to conclude later in the winter. To-night I will merely give the results of the work which I have already accomplished on this subject, and which leads me to believe that the views which have heretofore been held concerning the various diluents and attenuants used in modifying the albuminoids in cow's milk are not only theoretical, but incorrect.

Human milk and cow's milk both contain, as a part of their solid constituents, certain nitrogenous matters. The exact chemistry of these nitrogenous matters has not yet been satisfactorily determined, but in a general way it is allowed that their total amount is in human milk from 1 to 2 per cent., and in cow's milk 4 per cent.; also that a part of these nitrogenous matters is coagulable, and a part not coagulable; also that a part of the coagulable portion consists of a chemical combination called casein; also that the non-coagulable portion of the nitrogenous matters in human milk is greater than the coagulable, while the reverse of this is true of the nitrogenous matters in cow's milk. This difference in the coagulable quality of the two milks has, so far as I can judge, drawn the attention of clinical observers too exclusively to the endeavour to break up, as they express it, the larger curd of cow's milk by the means above spoken of. My own belief has long been, that practically for the successful feeding of the young infant with cow's milk (so far as the coagulum is concerned) it is quite as, if not more, important to consider that the total amount of these nitrogenous matters being two to four times as great in cow's milk as in human milk, it is more practical to dilute these matters in cow's milk until the dilution corresponds to that found in human milk, and that then the coagulum will be found to correspond very closely to that of human milk, and will not require to be broken up. An instance which seems to show that this reasoning is practical has recently come to my notice. It is often stated that the curd of human milk is small, soft, and easily broken up, while that of cow's milk is large, tough and tenacious, so that we should add something to the latter to make the curd fine and friable. These characteristics of the two curds I have found to be present where the milk is in a comparatively normal condition as to the percentage of its albuminoids.

When, however, the percentage of albuminoids in human milk reaches that which exists in cow's milk, we find a curd with the characteristics of cow's rather than human milk, as I found exemplified in the following instance referred to above. An infant seven days old, and unusually vigorous and well developed, was provided with the milk of a healthy wet nurse, who had been accustomed to plain but good food. An analysis of the milk made just before it was given to the infant showed the albuminoid percentage to be 2·53 and the water 89·78. The milk was digested perfectly, and the infant throve for the following three weeks. During these weeks, however, the diet of the nurse was changed from the plain food to which she was accustomed, to a much greater variety and amount, and to very rich milk, her usual exercise also being lessened. The infant then began to vomit thick curds identical in appearance and toughness with the curds of cow's milk. An analysis of the milk was then again made, and the albuminoids found to show the high percentage of 4·61, and the water to be 83·50. The nurse was then fed on plainer food and skimmed milk, and the infant soon ceased to vomit. A third analysis of the milk now showed the albuminoids to be decreased again to 2·9. The following figures speak for themselves:—

Analyses of Wet Nurse's Milk.

	I. Just before change of food. Infant did well.	II. Rich food for three weeks. Infant vomited.	III. Plain food. Infant did well.
Fat . . .	0·72	5·44	5·50
Sugar . .	6·75	6·25	6·60
Albuminoids	2·53	4·61	2·90
Ash . . .	0·22	0·20	0·14
Total solids	10·22	16·50	15·14
Water . .	89·78	83·50	84·86
	100·00	100·00	100·00

This case is also interesting in view of the statements made by certain German authorities, notably Escherich, that the young infant can digest the high percentage of albuminoids in cow's milk provided that the milk has been sterilized. The milk in this case was certainly sterile, but it did not agree with the infant when it attained the albuminoid percentage of cow's milk, and did agree perfectly when this percentage was reduced to correspond more nearly to human milk.

This case would also seem to point towards simple dilution with water as the most practical way of managing a thick, tenacious curd, for it was certainly by increased water in the wet nurse's milk, and not by alkaline diluent or cereal attenuant that the curd was rendered more digestible. As, however, it seems to be pretty generally held by physicians that some such chemical and mechanical means are necessary, the next question is, Do such diluents and attenuants accomplish the results which are claimed for them? One of the latest writers on this subject says, "Firm clotting may be prevented by the addition of an alkali or a small quantity of some thickening substance, such as barley water, or one of the digestible prepared foods." This statement seems to be pretty generally accepted, as does also the following, that "Lime water is the alkali usually selected, and that it acts by partially neutralizing the acid of the gastric juice, so

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* Read before the Obstetrical Society of Boston, December 8, 1888. From the *Boston Medical and Surgical Journal*, February 7.

that the casein is coagulated gradually and in small masses."

In lime water we undoubtedly have an alkali which can readily be used for neutralizing the acidity of milk without changing the percentage of the ash, the oxide of lime in the lime water being so infinitesimal that it can safely be left out of the question in the chemical result.

The table which I will now ask your attention to will explain the results which I have come to from my experiments with lime water, namely, that it is useful simply to render acid cow's milk alkaline, and that its alkaline properties do not seem to influence the size and tenacity of the curd any more than does plain water; hence that the coagulum grows smaller on account of their being less nitrogenous matter to coagulate, when we gradually dilute cow's milk, just as it did with woman's milk in the case of the wet nurse above spoken of.

Cow's Milk Twenty-Four Hours Old.

1. Woman's milk	No curd seen.
2. Cow's milk raw 3. „ „ boiled 4. „ „ sterilized by steam	Large curds.
5. Cow's milk—2 parts Water— 1 „	Curd finer than 2, 3, and 4.
6. Cow's milk—2 parts Lime water—1 „	Curd same as 5.
7. Cow's milk—2 parts Water— $1\frac{1}{8}$ „	Slightly finer than 5 and 6.
8. Cow's milk—2 parts Barley water—1 part	Same as 7.
9. Cow's milk—1 part Water— 4 „	Finer than 7 and 8.
10. Cow's milk— 1 Cream— 2 Milk sugar ʒ 18 / Water — 1 pint — 3 Lime water — 1 Water— 3 — 2 — 8	A very fine curd, finer than 9.
11. Cow's milk—1 Water— 5	No curd seen.

The results as tabulated were verified by competent observers in the laboratory. Equal volumes of fluid in test-tubes. Ten drops of acetic acid added to each test-tube. Each test-tube inverted slowly three times, so as to ensure thorough, equal and uniform mixing in all.

Taking up this table a little more in detail, we see that there was found to be no difference in the coagulation of raw, boiled or steamed milk; also that practically the size of the curd depends on the dilution of the albuminoids, rather than on any especial property belonging to the substance with which the dilution is made. With lime water the result is the same as with water in equal amount, and barley water only shows a fractional difference from the results with plain water. In these experiments also there was found to be no perceptible difference as to the rapidity of the coagulation of the different fluids, and that cow's milk taken directly from the udder was found to coagulate in just as large curds as when twenty-four hours old. It might also be added that when a few drops of mercuric nitrate solution was added to human milk, a decidedly larger curd was formed than when this reagent was added in the same way to cow's milk diluted 1 part to 5 of water.

In order to see if the statement so often made that attenuants act mechanically by getting, as it were, between the particles of coagulum during coagulation, and thus preventing their running together and forming a large compact mass, I have lately experimented as follows with various substances:—

In each of six test-tubes of equal calibre and containing 5 c.c. of hot water, 10 c.c. of milk was placed. In test-tubes 2, 3, 4, 5, and 6 was added equal portions respectively of Mellin's Food, Robinson's Barley, Imperial Granum, cracker crumbs, and bread crumbs.

The albuminoids were coagulated as before with acetic acid, and the following results were obtained:—

1. Hot water and milk, finest curd of all.
2. Hot water and milk and Mellin's food, not so fine as No. 1.
3. Hot water and milk and Robinson's barley, about like 2.
4. Hot water and milk and imperial granum, not so fine as 2 and 3.
5. Hot water and milk and cracker crumbs, not so fine as 4.
6. Hot water and milk and bread crumbs, not so fine as 5.

There was no doubt but that where no attenuant was added the curd looked decidedly finer, while, where attenuants were used there was not a great deal of difference between the substances employed, excepting the possibly rather larger curd according as the attenuant contained a larger percentage of starch. We may conclude, then, until something more definite is known concerning this rather theoretical method of treating the albuminoids of milk, that dilution with plain water is the most practical and efficient means at our command.

AMERICAN METHODS OF MANUFACTURING OLEOMARGARINE.*

The following ingredients enter into the manufacture of oleomargarine as pursued in the United States:—Oleo oil, neutral lard, some liquid vegetable oil, as cotton-seed, sesame, or peanut; butter, in the higher grades, cream and milk, together with salt, and annato or other colouring matter. A brief statement of the general system pursued in the preparation of the ingredients and of the finished products, may not be uninteresting. Very few of the oleomargarine manufacturers make their own oleo oil or neutral lard, and none of them refine or crush the vegetable oils used in the lower grades of oleomargarine, but buy them in the open market, these materials being now well established commercial products.

The manufacture of oleo oil is generally carried on in connection with the large slaughter and packing houses situated in or near the principal cities, where every effort is made to utilize all portions of the cattle slaughtered. The caul and suet fats are removed from the freshly slaughtered beeves and placed in tanks filled with water at 75° to 85° F., where they remain from two to three hours before being transferred to other tanks containing ice water. By this procedure the fats are gradually deprived of their animal heat and the danger of their becoming sour is avoided, as would happen if the mass of fat was suddenly chilled by being placed directly in ice water. The caul, long or slaughter fat, is kept separate from the suet fat, which yields an inferior grade of oil.

A Texan steer will yield on an average 65 pounds of caul and suet fats, from which are obtained 28 pounds (43 per cent.) oleo oil, 21 pounds (32 per cent.) oleo stearin, and 12 pounds (20 per cent.) high grade tallow. The chilled fats having been thoroughly washed to remove any blood that may be present, are then sent to the rendering tanks. These are generally in a separate building from the slaughter house. Fat from cattle slaughtered late in the afternoon is generally kept in the ice-water tanks over night before being rendered;

* From Report of United States Commissioner of Internal Revenue. Reprinted from the *Pharmaceutical Era*, February.

thus no fat is more than twelve or fourteen hours on hand, and the great majority less than four hours, before it is rendered. The fat is fed into choppers or hashers revolving at a high rate of speed, from which it issues through fine sieves directly in the rendering tank. This is a large steam-jacketed upright kettle of 2000 to 5000 pounds capacity, provided with revolving blades driven by suitable machinery. Steam being turned on in the jacket, the hashed fat is fed continuously into the tank and kept in motion by the stirrer. When the tank is full and the contents thoroughly melted, the temperature being 120° to 150° F., the stirrer is removed and the water and scrap allowed to settle. The clear fat is drawn off from the top and run into the graining or seeding cars of 400 to 600 pounds capacity, where it is allowed to chill. The temperature of the room in which these cars are stored is maintained at 85° to 95° F. The fat in chilling naturally solidifies gradually; the hardest variety, the stearin, being the first to form a thin crust on top and sides. In from one to three days the whole contents of the car will be in a semi-solid condition. This fat is free from all "greasy" taste. The car containing the semi-solid fat is taken to the press room, which is maintained at a temperature somewhat below that of the seeding room, viz., 70° to 80° F., where it is dipped out by ladle and poured on a stout linen cloth, placed in a suitable depression on a wooden revolving table, and after the cloth is properly folded so as to make a rough bag, it is transferred to the metal plate of a screw press. A dozen of these cloth bags cover the surface of a plate. When one plate is covered another one is let down and filled.

When the press is filled, pressure is gradually applied by means of an endless chain revolving a screw; the expressed "oil" constitutes the "oleo-oil." The liquid fat is conducted, still hot, from the press into barrels or cars, where it is allowed to cool. The finished product is nearly colourless, tasteless, and at ordinary temperatures is a soft, granular fat, rather than an oil. The hard fat remaining in the filter bags is removed from the press and forms the beef or oleo stearine, which is used either for making "refined lard," by the addition of cotton-seed oil, or sold to the soap and candle makers.

The manufacture of "neutral lard" is conducted by essentially the same machinery and at about the same temperature employed in the manufacture of "oleo oil." Only the leaf-fat of freshly slaughtered hogs is used. A hog yields from 5 to 15 pounds of leaf-lard, averaging 9 pounds; 100 pounds of which yield 90 pounds "neutral." The "neutral," however, is not pressed to extract the stearine, but is run directly from the rendering tank into a very strong iced brine, where it remains for about twenty-four hours, when it is removed and placed on shelves to drain. The "neutral" is a white, slightly granular, tasteless, solid fat. The skimmings and scrap from the lard-rendering kettles are strained, and the fat, about 2 per cent. of the original charge, obtained from them added to the steam-rendered product. Several factories, however, use the ordinary steam and kettle-rendered lards, and not "neutral." Great cleanliness is observed throughout both processes, and there is very little manual handling, machinery being used as much as possible, and the fat carefully guarded from any source of contamination.

The by-products of oleo oil and neutral, viz., stearine, tallow and lard, are standard merchantable articles. Only fresh and sweet fats are used, and tanks, etc., are thoroughly cleaned before use, as a small amount of fat, if allowed to adhere to the apparatus, is liable to decompose in such a way as to spoil the succeeding batch of materials worked up.

Though there may be slight differences in the details, the range of temperature, size of tanks, etc., pursued by the different manufacturers, the general procedure is as above described, the object being to obtain a neutral fat, melting at butter temperature.

The vegetable oils are prepared by crushing the seeds, etc., and subjecting the crushed mass to hydraulic pressure, or by extracting the oil by carbon bisulphide or other solvent. The crude oil thus obtained is refined to remove the colouring matter by treatment with mineral acids and subsequent neutralization by alkalies, and chilling and pressing, whereby a product is obtained of a light straw colour and bland taste.

The butter used is always selected for its high flavour and taste, and is generally obtained direct from the creamery. Owing to the granular character of oleo oil it becomes necessary to add some softer and smoother fat; and neutral lard and cottonseed or other similar vegetable oil, are added for the purpose of making the mixture more closely approach the consistence of butter. The proportions in which these ingredients are used vary with the seasons of the year, the grade desired, and the formulas of the manufacturers. The charge of milk or cream, however, is the same for all grades manufactured by any particular factory, and varies from 10 to 20 per cent. The milk or cream is allowed to become slightly sour.

The churn used is steam jacketed, of 1,200 to 2,500 pounds capacity, and the whole operation of churning is conducted at a temperature of 85° to 105° F., insuring the melting and thorough mixture of all the solid fats used, thus differing from ordinary creamery practice. The oleo oil and neutral lard are melted in separate kettles at a temperature of about 90° F. The charge of milk or cream is first run, and the paddles kept in motion until the butter begins to form. Then the charge of melted oleo oil is added and stirred. When this is well incorporated the neutral lard is run in, and finally the annatto, to give the desired butter colour. The butter is added either directly into the churn, being first melted, or it is worked into the oleomargarine after it is taken from the churn. The temperature is carefully regulated, being about 85° F. at the beginning and gradually increasing to 105° F. at the end, when the whole charge has the appearance of a yellowish, creamy fluid. From twenty to ninety minutes are occupied in the churning. The whole melted charge, after it has been sufficiently churned to thoroughly incorporate all the ingredients, is run either directly into tanks containing chopped ice and constantly stirred, or is met by a stream of ice water as it issues from the churn. The object is to give the melted mass a fine grain by this sudden cooling. The chilled mass is removed from the tanks and placed on wooden trays to drain. Here the salt is added and allowed to work itself in, which generally takes from twelve to twenty-four hours. The salted mass is then thoroughly worked by mechanical rollers, to remove the buttermilk and water, following the general practice of creameries in this and subsequent operations of packing, etc.

Oleomargarine is placed on the market either "solid packed" or in prints or rolls. Four grades are generally made, known as "dairy" and "extra dairy oleomargarine," "creamery" and "extra creamery butterine," the last two containing from 10 to 25 per cent. of the best creamery butter. In the lower grades, from 25 to 60 per cent. of neutral lard, from 20 to 50 per cent. of oleo oil, from 5 to 25 per cent. of vegetable oils, and in some cases from 2 to 10 per cent. of butter, with 10 to 20 per cent. of milk or cream, are the proportions used. Some factories employ no vegetable oils in their oleomargarine, preferring to use a larger proportion of neutral lard with a small amount of butter to obtain the desired butter consistency. In the higher grades the proportions of oleo oil are reduced, the vegetable oils are discarded, and creamery butter is used to make up the charge.

The Pharmaceutical Journal.

SATURDAY, MARCH 2, 1889.

FERMENTATION OF SUGARS.

It has generally been considered that alcoholic fermentation was a characteristic property of the true sugars, and especially of glycose, but the point has never been definitely established. Dextrose and levulose are well known to be readily susceptible of fermentation, but sorbin, the sugar of the mountain ash berries, though isomeric with grape sugar, has usually been described as incapable of undergoing fermentation, and the statements in regard to the fermentation of galactose are very discordant and even contradictory, though it is a substance that is easily obtainable. Thus Dubrunfaut described galactose as being incapable of alcoholic fermentation, and shortly afterwards Pasteur stated that it would undergo fermentation. Fudakowski's observations led him to the same conclusion, but both Kiliani and Koch held an opposite opinion, while according to Von Lippmann galactose was represented as being perfectly fermentable with ordinary beer yeast. Arabinose, again, has been described as contrasting with the true glycoses in being incapable of fermentation, since Schiebler as well as Von Lippmann had not succeeded in making it ferment. The interest attaching to this question under these circumstances has induced Messrs. Stone and Tollens to take up the investigation of the subject so as to test the grounds of these discrepancies. With that object they have experimented with galactose, sorbin and arabinose, under carefully-arranged conditions, and have also made comparative simultaneous experiments with other sugars, the behaviour of which with ordinary yeast was well known. The result has been to establish beyond doubt the susceptibility of galactose to alcoholic fermentation. It will be understood that experiments of this kind are attended with numerous difficulties. The results are dependent, not only on the nature of the substance examined, but also upon the conditions of existence that are provided for the yeast which is the determining cause of the change, and if these conditions differ one observer may readily succeed in obtaining fermentation while another fails to do so with the same sugar. The method adopted was to employ a nutritive solution for the yeast, prepared by boiling fresh beer yeast with water. In all instances the alcohol produced was determined as well as the quantity of carbonic acid. A weighed quantity of the sugar to be examined was then placed with this liquor and some fresh yeast in a graduated tube, which was filled with mercury and inverted in a mercury trough. The requisite temperature was applied by means of an air bath with a large glass door and heated by a gas flame. A blank experiment was always made with the same yeast, leaving out the sugar, but in no instance was there any notable evolution of gas under these conditions. In the first experiments galactose was compared with cane sugar, and after the lapse of four days the gas evolved from the cane sugar ceased to increase in volume, but the gas evolved from galactose did not become constant in volume until after six days. In the former case it amounted to 48·95 per cent., and in the latter to 47·71 per cent. In the comparative experiments with dextrose, galactose and levulose, it was ascertained that galactose ferments much more slowly than dextrose, but eventually almost to the same extent. This was also found to be the case in comparing galactose with cane sugar, but the fermentation was also nearly complete, the amount of alcohol produced by cane sugar amounting to 47·12 per cent., that produced by galactose to 46·09 per cent. In the experiments with milk sugar and arabinose it was found that the fermentation was very slow, and the evolution of gas continued for twelve days, while that from cane sugar was completed in four days. In both cases the volume of gas was deficient, and on examination it was found to be inflammable, while the fermented liquors smelt of butyric acid and reduced Fehling's solution, showing that the fermentation was not a true acoholic fermentation. The results obtained by this investigation show, therefore, that galactose ferments almost as completely as dextrose; sorbin ferments more slowly; arabinose ferments very slowly with ordinary yeast, and with cultivated yeast not at all; while milk sugar is even less susceptible of fermentation than arabinose.

CHEMISTS' ASSISTANTS' ASSOCIATION.

The proceedings at the Annual Dinner of the Chemists' Assistants' Association, held at the Holborn Restaurant on Thursday evening, under the presidency of Mr. G. F. Schacht, may be described as in every respect a success. The Chairman was supported by Dr. Thomas Stevenson, the Visitor on behalf of the Privy Council to the Examinations, Mr. Alexander Bottle, Vice-President of the Pharmaceutical Society and several of his colleagues on the Council and the Board of Examiners, and a company that filled the large Venetian Room in every part. The toast of "The Medical Profession" was proposed by Mr. A. C. Stark, and happily responded to by Dr. Stevenson. This was followed by "The Pharmaceutical Society," proposed by Mr. T. A. Ellwood, and acknowledged by Mr. Alexander Bottle. The toast of the evening, "The Chemists' Assistants' Association," was proposed by the Chairman, who frankly confessed that an observance of its proceedings during recent years had broken down any feeling of doubt in respect to it that he might formerly have had. In responding, the President, Mr. E. J. Millard, said that seventy new members had joined the Association during the past year, and that the total membership now exceeds two hundred, besides forty patrons. After alluding to the papers that had been read, he referred to the probability of a new departure in the formation of a "Junior Pharmacy Club."

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

February 20, 21 *and* 22, 1889.

Present on each day—Mr. Carteighe, President; Mr. Bottle, Vice-President; Messrs. Blunt, Bowen, Corder, Druce, Fletcher, Gale, Gerrard, Greenish, Ransom, Saul, Symons, Tanner, Taylor and Thresh.

Dr. Stevenson was also present on behalf of the Privy Council.

MAJOR EXAMINATION.

20*th.*—*Three* candidates were examined. *One* failed. The undermentioned *two* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Andrew, Charles William.....Penzance.
Baxter, George Munnerley ...Chester.

21*st.*—*Two* candidates were examined. *Both* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Dyson, Archibald .....London.
Humphreys, Henry.....London.

22*nd.*—*Three* candidates were examined. *One* failed. The undermentioned *two* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Phillips, Wilfred Charles .....Stevenage.
Taylor, Edward .....Wakefield.

MINOR EXAMINATION.

20*th.*—*Twenty-eight* candidates were examined. *Sixteen* failed. The undermentioned *twelve* passed, and were declared qualified to be registered as Chemists and Druggists:—

Attenburrow, James ....Eastbourne.
Betts, Reginald .....Woodbridge.
Burridge, Henry Alfred.....London.
Butler, Edward Samuel .....Charlbury.
Dee, Arthur Henry.. .....Tewkesbury.
Emmerton, Edward.....Woburn.
Flint, Charles .....Stratford-on-Avon.
Foster, Murray Toogood.....Collumpton.
Haggis, Henry Charles .....Portsmouth.
Haigh, Walter .....Halifax.
Havard, Henry Lewis.....Penclawdd.
Smith, Arthur Charles .....Buckingham.

21*st.*—*Thirty-two* candidates were examined. *Fifteen* failed. The undermentioned *seventeen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Flint, Francis Bramwell .....Leek.
Heath, Jonathan Lucas.....Shrewsbury.
Hirst, Percy .....Manchester.
Horry, William Tom .....Boston.
Howden, Frederick Clair .....London.
Jones, Thomas John ..... Holyhead.
Knowles, Frederick William...Manchester.
Lakeman, Nicholas Frank.....Modbury.
Latchmore, Alfred ....Plymouth.
Lewis, Phillip Reynolds.....Carmarthen.
Ling, Frederic George .....Southampton.
Longman, Samuel Hurman ...Wincanton.
Mallinson, Frederick William..Spalding.
Matthews, Edwin James .....Cowbridge.
Powell, Samuel Rider.....Scarborough.
Ralph, Frank Horatio.....Devonport.
Scott, Walter Carey ..... Northampton.

22*nd.*—*Twenty-five* candidates were examined. *Fifteen* failed. The undermentioned *ten* passed, and were declared qualified to be registered as Chemists and Druggists:—

Dalwood, Harry F. Wadham...Sherborne.
Roberts, William.....Bangor.
Sayers, William Charles.....London.
Tabor, Thomas Slade .....London.
Timmins, Albert .....Kidderminster.
Turner, Ernest.....Cheltenham.
Vincent, Robert .....Nottingham.
Wain, Clement John .....Hanley.
Walters, Edwin .....Ashton-under-Lyne.
Wells, William.....Islington.

PRELIMINARY EXAMINATION.

22*nd.*—Certificates by approved examining bodies were received from the undermentioned in lieu of the Society's examination:—

Dickenson, Edmund Ernest ...Nottingham.
Smith, John James.....Otley.
Thomas, John Austin .....Dolgelley.
Thornley, John Brooks .....London.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

Photographic Printing and Development.*

BY H. C. EVERSON, F.C.S.

The photographic art can hardly be said to belong to pharmacy proper, but I think it ought, and does, possess an interest for pharmacists, both from a business and scientific point of view.

In these days of competition, when more and more is required of us in the workshop, in the counting-house, and in the various professions, the pharmacist cannot do better, I think, than make himself acquainted with any technical matters that call into play chemical knowledge, and thus arm himself better for the fight, and looking at it in this light, I think that a knowledge of photographic art will not be a detriment to him, but rather the reverse.

In the early days of the collodion process, when photography really became a practical science, the business of dealing in photographic chemicals and materials was largely, I may say, almost entirely, in the hands of the chemist, who was also in many cases the scientific adviser of his photographic customer. Why should it not be so now?

I could mention the names of many eminent pharmacists who largely contributed to the advancement of photographic knowledge by their skill and advice. I can tell you of an instance that has occurred just recently where such advice would have been very useful. A gentleman amateur, who had a smattering of chemistry—well, everybody has a knowledge of chemistry nowadays, and this goes well to illustrate the old proverb that a little knowledge is a dangerous thing—had learned that barium chloride precipitates sulphuric acid and sulphates. You all know that the sulphites (sulphite of soda, for instance) have come into general use in developers, and you perhaps know that it is almost impossible to crystallize them so that they shall be entirely free from sulphate, unless it be done *in vacuo*, and this amateur says to himself, I will have my sulphite quite free from sulphate, and thus have my developer so much purer and better; so he adds and adds chloride of barium (for he did not know that chloride of barium precipitated sulphite as well as sulphate). Well, I do not quite know whether he added chloride of barium till his solution would precipitate no longer, but this is certain, he was convinced that he got a better result, and forthwith wrote to the photographic papers about it. I may add that, as in medicine, so in photography, faith sometimes goes a long way.

Independently of all this, photography as a hobby

* Read at a meeting of the Chemists' Assistants' Association, January 31.

possesses great attractions. There is hardly anything I know of that gives more gratification than the taking of a good picture; in holiday rambles also it is an unlimited source of pleasure and amusement, allowing one to be able to record places and scenes that have been visited, and thus bring them back to memory fresh years after, when otherwise they might be forgotten.

Photography also affords opportunities for the ambitious. I have here an illustration of this. My old friend, Mr. H. Mason (who is also of rather a romantic turn of mind), one fine day in his holiday rambles invited his friends to have their photographs taken on the "Goodwin Sands;" how well he succeeded, I think the result shows. The sands, as you are aware, are accessible only at certain states of the tides, and then only for a very limited period; thus, Mr. Mason has done what has never been done before, at least, I have never seen a record of it.

In a short paper like this it would be impossible to go fully into all the photographic processes that have been invented. I therefore propose to bring before your notice only a few selected, the fittest that have survived, and are most promising for the future. I do not intend to go fully into the manipulation of such processes; anyone that wishes to do so cannot do better than consult upon the subject the excellent works of Captain Abney, who is, perhaps, the most able exponent that we have of photographic matters generally, from whatever point of view.

Mr. Butterfield, in his excellent paper read before this Association a few weeks ago, gave you a complete history of the rise and progress of photography. He showed you how to take a photograph, and other manipulative details necessary to effect that object; it will therefore only be necessary for me to make a few remarks upon the sensitive films employed, before proceeding to my subject proper, viz., Developers.

In the first place comes collodion (it was in the early days of the collodion process that I first became "A Companion of the Bath"). It was collodion that made photography what it is. Since its introduction by Scott Archer in 1851 photography, as a practical science, has been gradually growing up. It was collodion that was first used as a medium for giving a fine layer or sensitive film containing the haloid salts of silver, as a sort of emulsion on the sensitive plate. Of late years gelatine has largely superseded collodion for all general purposes, on account of its extreme convenience and simplicity, but for some purposes collodion still retains its place. For instance, in copying drawings and other subjects, where fine lines exist, collodion alone succeeds; in gelatine plates the fine lines become blocked up in development. For making transparencies for the lantern also, collodion still continues to be used as the results generally are brighter and more vigorous. Those who have worked with collodion need not be told of the difference in appearance between a collodion and a gelatine negative. I have here some transparencies, copies of Cruikshank's original engravings, "Cinderella." Those who have been accustomed to gelatine plates *only*, will at once see the difference. These plates were made by what is known as Canon Beechy's collodion emulsion process. Before gelatine dry plates came into existence such plates as these were used for outdoor work generally, and although the exposure was very much longer gave excellent results where still objects had to be taken, and for lantern slides I can strongly recommend them still. They give excellent transparencies. Mr. Brooks, of Reigate, has just sent me two beautiful transparencies made with collodion emulsion. He, like myself, pins his faith to collodion for this work. He is an expert in this matter; he has lately, by permission of Her Majesty, been engaged in photographing the interior of Windsor Castle. These two pictures are copies of some of the results. One is the "Entrance Hall," and the other is the "Presence Chamber." I think they are some of the finest of the kind that I have seen. To my mind it seems that there still remains to some enterprising mind to discover a film that will give the brightness of collodion film, and still retain, so to speak, the vitality of the gelatine plate, which does not dry up and become hard and horny as does collodion, thus becoming impervious to the action of developers.

On reading Mr. Ellwood's paper on alginic acid, and the alginates, it struck me that, possibly, they might be used in the place of collodion or gelatine. I should like to ask Mr. Ellwood if he has any experience in this direction. I am told that a patent has been taken out with reference to this matter. My friend, Mr. E. H. Farmer, has patented a new medium, which, I understand, can be used either in the camera or as a printing process. I am not quite certain what the process is, but I can show you some excellent prints taken by it.

You are all aware that the sensitive films generally employed for recording the effects of light are emulsions of one or other of the haloid salts of silver in the mediums already mentioned or others. The effect upon the sensitive film of light reflected from the various objects in view, as generally accepted, may be said to be this, and we cannot do better than go back to Scheele's early experiments as to the effect of light upon chloride of silver in the presence of water. He found that it darkened, and in the fluid was dissolved a substance that gave once more on the addition of nitrate of silver, chloride of silver, and that the blackened body, upon the application of ammonia, left behind metallic silver.

Now at the present time the generally accepted theory as to the development of the photographic image may be said to be this, and no more, that when a sensitive surface of one or other of the haloid salts of silver is exposed to light, the salt is reduced to a subsalt (say $Ag_2Cl_2 = Ag_2Cl + Cl$). We have no reason to doubt of the existence of such subsalts, as they are fully described in modern text books on chemistry. This subsalt is, on the application of reducing agents, brought to the metallic state, and this metallic deposit of silver in contact with other molecules, of the unaltered haloid, in the film, reduces them to a state of subsalt, to be again reduced to metallic silver on the application of the developer; and in this way the image is built up. The same general statement applies to the other haloids, the iodide and bromide of silver, although the reactions which take place are not quite identical in each case.

Of the reducing agents usually employed to develope the photographic image, pyrogallic acid and the ferrous salts stand foremost. Pyrogallic acid is most generally used with an alkali; it is a powerful reducing agent and absorber of oxygen, and for many years has held its place in the foremost rank of developers. There is this objection, however, to its use, and that is, it stains the gelatine film, thus retarding the subsequent printing process. It colours the developing solution in the dish used for the purpose, and as you have to work in a very subdued light you cannot very well see how your picture is coming out. It has also the uncomfortable practice of staining the fingers in a very disagreeable manner, and it is said to be not altogether innocuous. It is a trihydric phenol, and may be represented by the formula $C_6H_3(OH)_3$.

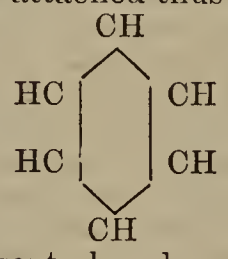
The ferrous salts come next. The form now generally employed is a solution of ferrous oxalate made by double decomposition between solutions of neutral oxalate of potash and ferrous sulphate. It is an excellent developer. I myself prefer it to pyrogallic acid; but it is messy, and is even more highly coloured in solution than pyrogallic acid, therefore the same ob-

jections apply to it. This can, however, be said in its favour, that it gives better printing negatives.

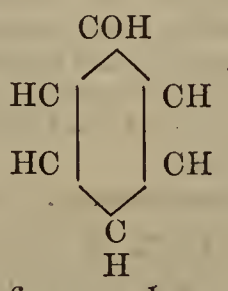
Now I wish to bring before your notice another class of developers, viz., the dihydric phenols. They can be used with an alkali in the same manner as pyrogallic acid; they do not stain the film or fingers in the same manner as that body does, nor does the solution in the developing tray become coloured. It is quite a treat to be able to see all the details of your pictures gradually developing distinctly to the eye in a colourless solution, as is not the case with the developers already mentioned. The solution can also be used over and over again until exhausted, still remaining uncoloured. Here are three transparencies developed in this manner. You are not able to tell which was developed first and which last. I am quite sure that anyone trying hydroquinone, for instance, will not be in any hurry to go back to pyrogallic acid again. Our President, on the occasion of the reading of Mr. Butterfield's paper, when hydroquinone was mentioned, asked the question, if the isomer resorcin had ever been tried? Now, although the same suggestion had often occurred to me I had never tried it, and resolved to do so forthwith, and not only this, but another isomeric dihydric phenol, "pyrocatechin." For this purpose I made a solution of each of the respective substances in question 4 grains to the fluid ounce, with in each case 20 grains of sulphite of soda, 1 grain of bromide of potassium, and 4 grains of caustic soda.

The same negative was then exposed over a sensitive plate, six inches from an ordinary gas flame for ten seconds, and the sensitive plate after exposure treated in each case for ten seconds to the action of the respective developers, with the following results. Here I have the developed pictures; you will see that they stand in this order:—1st, hydroquinone, most highly developed and intense; 2nd, pyrocatechin, well developed; 3rd, resorcin, no image developed at all. It will thus be seen that hydroquinone is the most powerful, that pyrocatechin comes next, and is a really good developer (but it is very expensive, and that would prevent it coming into general use), and that resorcin is no developer at all. I ought to state also that in the case of this last the exposed plate was left in its solution for thirty minutes, and the strength of the solution trebled without any sign of an image appearing, as you see by the plate I have here.

Now in order to understand somewhat of the chemical nature of these dihydric phenols or dihydroxybenzenes, as they are sometimes called, we must have recourse to the constitutional formula used by chemists to put their ideas into shape, known as the "benzene ring." If we represent benzene as an hexagonal figure having six carbon points, to which the hydrogen atoms are attached thus—

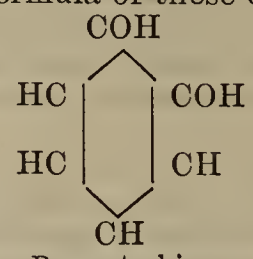


then we may represent phenol, or monohydric phenol, as we may call it,

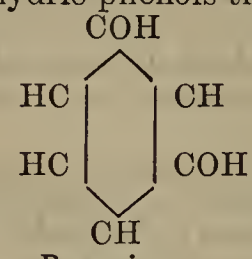


As that is the same figure as benzene, but the hydrogen replaced at the top by OH, it is evident then when we come to the dihydride phenols that the hydroxyls can be so attached to the points of the ring that there are three positions in which they can be placed, so that they are at different distances from each other.

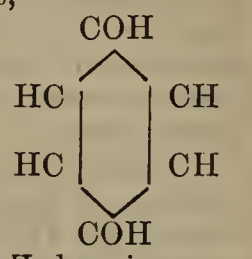
And in this way we may represent the constitutional formula of these dihydric phenols thus,—



Pyrocatechin.



Resorcin.



Hydroquinone.

It is usual to simply number the different points of the ring, and the different positions are then spoken as 1·2 ortho, 1·3 meta, 1·4 para; thus it will be seen that pyrocatechin is the ortho, resorcin the meta, and hydroquinone the para dihydroxybenzene. Now in order to explain, if we can, the reason of the difference in chemical activity of these compounds, we cannot do better than turn to a very amusing, as well as instructive paper read by Dr. Lauder Brunton before the annual meeting of the British Medical Association in 1886, on "The Relation of Chemical Constitution to Physiological Effect" (and when we speak of physiological effect we may also expect corresponding chemical activity). Now Dr. Brunton spoke of the flesh-pots of Shiloh; he talked of open chains and closed chains, of the different points of such chains where the sharp hooks, such as hydroxyl, might be attached, and the sum and substance of his paper was this, that the better arranged the hooks the more flesh could be hooked out of the flesh-pots. Speaking of these dihydric phenols, he says that in consequence of the different arrangements of the hooks there is no doubt that the position of the hydroxyl groups in these bodies considerably affects their chemical activity. And, as a matter of fact, pyrocatechin and hydroquinone both reduce nitrate of silver at ordinary temperatures, while resorcin only does so on boiling. As antiseptics hydroquinone is the most powerful, pyrocatechin next, and resorcin last, and I think these facts are fully born out by my experiments.

Now as to printing processes, as with the developers, I only intend briefly to treat of those that are likely to be to the front in the future.

The albumenized paper print is so well known that it is quite unnecessary for me to say anything about it, except that I have no doubt for portraits it will still retain its place for some time to come; but there are other processes that I think will be the processes of the future, for painting landscapes, views, etc., both on account of their permanency and beauty. At the last exhibition of the Photographic Society it was very noticeable the increasing number of "Platinotype" prints, some of them of rare excellence. This process was first introduced by Mr. Willis, who took out a patent for it. He found that when a platinous salt, such as potassium chloroplatinite, was mixed with ferric oxalate and exposed to light on the prepared paper, and floated upon hot solution of potassium oxalate, where light had acted, the platinous salt was reduced to the metallic state. The following seems to be the reaction that takes place.

$$Fe_2(C_2O_4)_3 = 2Fe(C_2O_4) + 2CO_2.$$

When the hot solution of potassium oxalate is applied, the ferrous oxalate is decomposed, and the following takes place.

$$6Fe(C_2O_4) + 3K_2PtCl_4 = 2Fe_2(C_2O_4)_3 + 2Fe_2Cl_6 + 3Pt.$$

It is a very pretty process, and it is interesting to watch the image gradually coming up in the hot solution of potassium oxalate. If a good, vigorous negative has been employed, the finished results are very fine indeed, and as the image is in metallic platinum, it is presumably permanent.

There was one drawback, however, to this process of

Willis's, and that was this, that it required a good deal of experience and judgment to tell when the printing was sufficiently deep, or not, as all that could be seen on taking the print out of the frame was only a faint image in yellow ferrous oxalate, and whether the print was right or not could not be told till it had been in the developing solution. Captain Pizzeghelli has recently remedied this somewhat, by coating the paper with the developer (an alkaline oxalate such as oxalate of soda), as well as with the ferric and platinous salts, so that on exposure to light the picture is printed out to view just as silver prints are, and only requires fixing by washing in some dilute acid. Another improvement of Pizzeghelli's is, that he uses instead of ferric oxalate, either a double salt of potash, soda, or ammonia, with ferric oxalate, which are definite and crystallized salts, whereas ferric oxalate can only be made in solution, and such a solution had to be standardized before being used.

I have now another printing process to describe, or rather a principle upon which a number of processes depend, photo, mechanical, and otherwise. To go into the details of the various processes would be impossible in the limited time at our disposal; I shall therefore content myself by briefly explaining the principle upon which these processes depend, and that is this:—The property that chromic salts, such as the dichromated alkalies have of rendering organic matter such as gelatine insoluble when exposed to light. This fact has been taken advantage of, generally speaking, and applied either in one or other of these two ways.

Either the gelatine is pigmented with some permanent dye, so that when exposed to light under a negative the portion of the tissue that light falls upon is rendered insoluble, leaving the parts of the picture not acted upon soluble, so that the result has only to be treated with hot water to dissolve out the soluble portions, leaving the picture in pigmented gelatine upon the support to which it is attached; or the prepared gelatine is simply exposed to light under a negative, developed in hot water and transferred to zinc or stone to suit the requirements of the various processes for the printer's use.

Of all these processes there is none, probably, that would serve our purpose of illustration so well as that of the "Woodburytype," invented, some years ago now, by the late Mr. Woodbury.

Through the kindness of my friend, Mr. W. J. Wilson, I am able to show you some specimens that admirably serve to illustrate this process.

I have here the gelatine print that has been prepared by exposing a rather thick film of gelatine resting upon a collodion support (the collodion side next to the negative), under a negative to the action of light, arranged so that direct light falls upon the negative. It requires rather a strong light (the Woodbury Company, I believe, use the electric light). After exposure this gelatine film is developed after the manner of such processes in hot water, and then dried. The picture, as you see, stands out in relief, depending upon the depth to which the light has penetrated the sensitive film. Next we have here an impression from this gelatine relief: it seems rather incredible, but it is got by placing the gelatine print upon a soft metal such as lead and submitting it to many tons pressure; so hard has the chromic salt rendered the gelatine, that not one only, but six or eight impressions are taken from the print, I am told. Next this metal mould is placed in a suitable printing press, covered with hot pigmented gelatine, suitable paper placed above this, the press applied to squeeze out superfluous pigment, leaving the print upon the paper. Here are some of the prints from this process. I think you will agree with me that nothing better can be desired. Here are also some lantern slides made by the same process. My own opinion is that they are excellent.

The Woodburytype process is largely used for publication, whether it be for photographs or illustrations of books, and the prints can be produced at a very small cost. Now I think I have finished, and it only remains for me to thank Messrs. Hopkins and Williams for the loan of these rare chemicals to illustrate the purpose of my paper; also to thank Mr. Wilson (representing the Woodbury Company) for the loan of these valuable specimens, and you, gentlemen, for your attention to my paper.

The President said that the Association was greatly indebted to Mr. Everson for a paper of so interesting and practical a nature. It was rendered more so from its being the second paper on photography in one session, the subject being fresh in the minds of members. Having pointed out the great advantages which would undoubtedly accrue to pharmacists from studying the art and thus preventing the sale of the many chemicals employed, he referred to the development of photography during the last few years, it now ranking as one of the sciences. With reference to Mr. Everson's trials of the dihydric phenols as developers, the President said that he had anticipated the failure of resorcin, and congratulated Mr. Everson on his success with pyrocatechin. He strongly recommended the platinotype process, on account of its minute accuracy and fineness of detail.

Mr. F. Ashley Rogers said he was especially interested in that branch of photography which was connected with microscopy, and asked Mr. Everson if he had had any experience of microphotographic work, as the results he had seen of attempts in this direction had been very unsatisfactory. He endorsed the President's remarks concerning the sale of photographic chemicals, and pointed out the desirability of cultivating as scientific a trade as possible.

Mr. Ellwood, in reference to Mr. Everson's mention of him in his paper, said he had not thoroughly investigated the properties of algin, but thought it had a future use in respect of dry plates in forming a film or support. In these days of instantaneous photography very little was left in the taking of photographs, and it remained for the chemist to improve the sensibility of plates, and the purity of chemicals, so as to get a really permanent photograph. He ought to understand the properties of the chemicals employed, and to be able to find some rule of action which might lead to useful results. One great defect in transferring pictures was the variability of light, and Mr. Ellwood thought that some means of chemically overcoming this hindrance might possibly be found. Albumen, too, might be replaceable by something else in the plates, as at present albuminized plates acquire a very objectionable odour. Mr. Everson had omitted to mention the autotype process, which is highly recommended for its permanency. The Woodbury photographs Mr. Ellwood thought extremely good, but said it was premature to speak yet of the permanency of the platinotype as compared with the older processes.

Mr. Richards fully endorsed all that had been said as to the sale of photographic chemicals by pharmacists, and spoke of the difficulty of obtaining pure articles from ordinary photographic dealers.

Mr. Smorthwaite, as a practical photographer of many years experience, who had managed to keep abreast of the times, had been deeply interested in the paper. The platinotype process he had little faith in as to permanency, two examples in his possession turning distinctly yellow. He strongly praised the autotype process, pictures by which had been unhurt in a fire which ruined all else in the room. The Woodburytype was well adapted for engravings, reproducing them with extreme fineness of detail; but was not successful in personal photographs, the flesh

appearing somewhat mottled. Referring to albumen, Mr. Smorthwaite said that it had much deteriorated of late years, blood albumen being employed instead of egg albumen; and the prints not so permanent as they were. With respect to the microphotographic work, Dr. Dallinger removes the eyepiece from the microscope and inserts a camera in its place, which has proved very successful. In spite of gelatine, he upheld the old silver bath, having obtained better results by that process than by any other. He advocated the introduction of fennel oil in alcoholic solution to overcome the resistance of the film, having employed it successfully. Pyrogallol he thought the best developer, the chief objection being the yellowness of the image in the negative, but this was of no consequence as long as a good result was obtained, and by experience any density required could be given.

Mr. Everson, in reply, said that he had belief in the efficacy of alginates in the future. The chromo-gelatine processes were generally represented by the plates exhibited. The autotype process he had to omit on account of the multiplicity of details; he believed in the permanency of autotype prints, and corroborated Mr. Smorthwaite's remarks on the inferiority of the albumen now used.

The proceedings then terminated.

A meeting of this Association was held at the Hanover Rooms, Argyle Street, W., on Thursday, February 21, the President, Mr. J. Millard, in the chair.

The second of a series of two lectures on "The Ear as a Musical Perceptive Instrument" was delivered by Dr. Macnaughton Jones.

After a brief recapitulation of the previous lecture, dealing with the anatomy of the ear, the lecturer proceeded to discuss the nature of sound and its mode of affecting the ear. The passage of a wave of sound through the various parts of the ear was shown by diagram, and the superior sensibility of the ear over the eye proved by experiment. Reference was then made to fundamental tones and the occurrence of harmonies, and it was shown that the ear possesses an extremely high fundamental tone. The lecturer then pointed out the wonderful power of the brain in being able to resolve the notes of a complex chord and then to recombine them to form one tune. The lecture was very fully illustrated by diagrams shown by the lime-light and by apparatus and experiment.

At the conclusion of the lecture a vote of thanks was proposed by Mr. Gordon Saloman and seconded by the President, and Dr. Macnaughton Jones having briefly replied, the proceedings terminated.

ROYAL INSTITUTION.

Electrical Stress.

A lecture was given by Professor Rücker on Friday, February 15, on Electrical Stress. It was shown by Faraday, while professor in the Royal Institution, that non-conducting bodies in the neighbourhood of a charge of electricity are affected by it, and thrown into a condition of tension or stress, and this was demonstrated by the lecturer in a series of brilliant experiments. To begin with it was explained that bodies charged with different kinds of electricity act on each other in directions which may be represented by lines, and these lines of force were illustrated by models. In the case of a magnetic field they are usually shown by the grouping of iron filings round the pole of a magnet. Experiments showing the same result in the case of a charge of electricity were performed, and rendered visible to the audience by being projected on to a screen. The currents set up in a liquid on plunging a charged conductor into it were shown by dipping a needle point into a layer of oil coloured red, floating on a layer of carbon bisulphide in a glass cell; on charging the needle from an induction machine violent currents were immediately seen to be set in motion, with an effect similar to that of a brush discharge in air. A novel and very interesting experiment was then shown by using phenyl-thiocarbamide, a liquid having a high refractive index; on approaching an electrified point to the surface it was seen to become depressed into a little dimple, and on plunging the point beneath the surface a bubble of air was carried down and kept down by the currents of liquid, just as a ball is sustained in the air by a jet of water. On withdrawing the point the liquid adhered to it, and by substituting a small globe for the point a cylinder of liquid was drawn up which could be seen to be running rapidly upwards on the exterior and downwards in the centre. The direction of the lines of force were very clearly shown by the experiment devised by Holtz of scattering sulphide of antimony in ether between two poles, when the particles aggregate in lines converging towards the positive pole and being repelled from the negative; on changing the direction of the current by a commutator the particles are instantly seen to fly in the opposite direction. The lecturer then explained that if all the lines of force acting between two oppositely charged bodies were taken they would form what might be called a tube of force, and this tube would tend to become shorter in the direction of its length and to spread out in a lateral direction. This was shown by imprisoning a bubble of air between two copper plates immersed in carbon bisulphide; on electrification of the plates, contraction of the air-bubble was shown by means of a small manometer in connection with it. In the case of a liquid or other dielectric thrown into a condition of stress, this action of the tubes of force passing through it would therefore tend to effect a re-arrangement of the molecules, producing closer packing in one direction than in another, and making the molecular arrangement analogous to that in a crystal. To show this analogy the action of a crystal on polarized light was explained by the aid of models; the effect was also shown by interposing a piece of gelatine between two Nicol's prisms and turning the second Nicol so as to cut off all the light. On the application of stress to the gelatine, by forcing a plug through it, light appeared on the screen, and varied in colour according to the intensity of the stress. The same effect was then shown to be produced by electrical stress in a series of varied experiments. A glass cell of carbon bisulphide was substituted for the gelatine, and the charging of two conductors immersed in the liquid was shown to produce the same phenomena as the physical stress in the gelatine. When the conductors were simply wires light was obtained on the screen; but when plates were substituted for the wires so as to produce stress in a longer column of liquid, the colour of the light was seen to vary with the intensity of the charge, changing from white to red, blue, green, etc., in the order of the colours in Newton's rings. This was again shown very effectively by having one of the plates bent so that its middle approached the other, when the colours appeared together on the screen, the more advanced colours in the middle where the stress was greatest, the less advanced on the outside. Some very striking effects were produced by combining the influence of electrical stress with physical stress. In one experiment stress was produced in a piece of glass rod by bending it, and thus pulling the molecules in the convex portion further apart while pressing those on the concave side closer together; the effect of this on the polarized light was to give a luminous band on each side of a dark central line, the light on each side being caused by stress of an opposite kind. On superposing the light caused by electrical stress in a layer of liquid, the position of the central dark line was shifted con-

siderably to one side, owing to the fact that the electrical stress increased the effect of the physical stress which was acting in a similar direction, while diminishing that in the opposite. Another modification, showing the direction of the stress in the di-electric of a Leyden jar, was performed by immersing in carbon bisulphide two plates each bent twice at right angles, and one within the other, so as to represent the inner and outer coatings of the jar; on charging these the space between, occupied by the di-electric, became uniformly luminous. A crystal of selenite was then interposed, and when the plates were not charged, gave a uniform field of blue light. On charging the plates, however, the stress in the vertical portion of the di-electric, acting concurrently with that of the selenite, advanced the blue colour to green, while that in the horizontal layer, acting transversely, diminished the blue colour to the less advanced red, the outline of the Leyden jar thus standing out from the blue field with a red base and green sides. When two concentric cylinders were used with the selenite plate the ring between them was divided into two opposite red and two opposite green quadrants. The effect of the stress on most bodies is to cause expansion, but in a few cases, such as the fatty oils, it is accompanied by contraction.

CHEMICAL SOCIETY.

A meeting of the Chemical Society was held on Thursday, February 21st, Mr. W. Crookes, F.R.S., President, in the Chair, when it was announced that the following changes in the Council list were proposed by the Council:—

As *President*, Dr. W. J. Russell, F.R.S.

As *Vice-Presidents*, Professor J. Emerson Reynolds, F.R.S., and Mr. Warrington, F.R.S., vice Mr. Howard and Professor Schorlemmer, F.R.S.

As *Treasurer*, Professor Thorpe, F.R.S., vice Dr. Russell, F.R.S.

As *Members of Council*, Mr. Norman Collie, Ph.D., Professor John Ferguson, M.A., Mr. S. U. Pickering, M.A., and Mr. J. F. M. Page, vice Professors Carnell, P. F. Frankland and Ramsay, F.R.S., and Mr. Friswell.

Messrs. R. H. Davis, R. J. Friswell, and S. Rideal were appointed by the meeting to audit the Treasurer's accounts.

Some certificates were read for the first time; several persons were elected Fellows of the Society.

The following papers were read:—

Note on the Decomposition of Potassic Chlorate by Heat in the presence of Manganic Peroxide. By Professor McLeod.—Having observed the alteration in appearance that peroxide of manganese undergoes when heated with potassic chlorate, the author has made a number of experiments, using different kinds of oxide of manganese, determining the loss of weight that the mixture suffers when heated and also the quantity of chlorine simultaneously generated. The heating was generally effected by the vapour of boiling mercury, at which temperature the potassic chlorate is not changed. The more finely divided the peroxide, the more rapid is the action and the more chlorine is evolved. When the evolution of chlorine is prevented by the addition of a small quantity of sodic or potassic carbonate, the decomposition of the chlorate proceeds very slowly, unless the temperature be raised much above that of boiling mercury. When potassic chlorate is fused with a minute quantity of peroxide of manganese, the residue is found to be pink on cooling, indicating the presence of a permanganate, and inasmuch as potassic permanganate is decomposed at a temperature of 275°, it is not improbable that the permanganate is decomposed by the heat as rapidly as it is produced into potassic manganate, manganic peroxide, and oxygen; the resulting potassic manganate is acted on by chlorine generated by the action of the peroxide on some fresh chlorate, forming potassic chloride, manganic peroxide and oxygen, so that the peroxide is being continually reproduced. The quantity of chlorine evolved corresponds to only a very small proportion of the manganic peroxide present, so if the first action really takes place, the chlorine must be absorbed and employed in converting the potassium into chloride.

Professor Thorpe, referring to the well-known fact that no perchlorate is formed in presence of manganese dioxide, asked how this was to be explained.

Mr. Williams stated that he had been unable to obtain the theoretical amount of oxygen from potassium chlorate by heating it *in vacuo*; a gas was given off which attacked mercury—presumably chlorine, and therefore it was probable that the residue contained potassium peroxide. On heating silver iodate *in vacuo* the theoretical amount of oxygen was obtained without difficulty.

Professor McLeod said that he was unable to account for the non-production of perchlorate in presence of manganese dioxide, as potassium perchlorate was not decomposed by heating with manganese dioxide, it probably was not even an ephemeral product. He had without difficulty obtained almost the theoretical amount of oxygen from chlorate. He did not think that the pink colour was due to ferrate, as had been suggested, as he had found that iron oxide gave a somewhat different colour.

Professor Ramsay remarked that Stas, in his determination of the ratio of potassium chloride to oxygen in chlorate, had not found that peroxide was formed.

The Vapour-density of Hydrogen Fluoride. By T. E. Thorpe, F.R.S., and F. J. Hambly.—Gaseous hydrogen fluoride, on being heated from a few degrees above the boiling point of the liquid, shows a rapid decrease in density, owing to the dissociation of HxFx, molecules ultimately into HF molecules, the course of the dissociation being similar to that observed in the case of nitrogen peroxide and acetic acid. The authors have carefully studied the molecular breaking down of the vapour as it is effected by changes of temperature and pressure. It would appear that there is no evidence for the existence of a molecule corresponding to the formula H_2F_2. If it exists at all, it must be formed only during the process of transition of HxFx into xHF, and be such that it can persist under given circumstances only in the presence of definite proportions of molecules more or less complex than itself. The density at above 32° corresponds apparently with H_2F_2, but the curve gives no indication of any condition of statical equilibrium in the neighbourhood of this temperature such as would be manifest if such a molecule were capable of independent existence. At temperatures below this point the density gradually increases in a perfectly regular manner, until at 26·4°, the lowest temperature observed, the density becomes 1·773, equivalent to a molecular weight of 51·2 (H_3F_3 = 60); as it is heated the vapour behaves like a mixture of a complex molecule HxFx, or of HxFx and HyFy molecules, with a gradually increasing number of molecules of HF, the process of dissociation being perfectly continuous until the temperature increases to about 60°, when the density becomes approximately normal, *i.e.*, corresponds to a vapour consisting wholly of HF molecules. As in the case of nitrogen peroxide dissociation takes place with increasing rapidity as the temperature increases until it attains a maximum, when about 50 per cent. of the heavier molecules have been decomposed, after which the increase becomes gradually smaller, at first slowly, then rapidly. The curves showing the mean increase resemble in fact that given by Naumann (*Thermochemie*, 1882) as representing the increase in the rate of dissociation of nitrogen peroxide, but with this very marked differ-

ence, that the mean increase for 1° C. in the case of hydrogen fluoride is at its maximum nearly three times as great as that of nitrogen peroxide. The authors have studied the effect of pressure on the course of the dissociation by attenuating a given volume of the gas maintained at the constant temperature of 32°, at which point the vapour is supposed to consist wholly of H_3F_2 molecules. It is seen that the slightest alteration of pressure at this temperature at once disturbs the ultimate proportion of the complex to the simpler molecules in the gaseous mixture—a fact which again points to the non-existence of a stable molecule corresponding to H_2F_2. The reduction of the actual pressure may be effected not only by direct attenuation but by mixing the vapour with a neutral gas. Experiments made by the addition of dry air showed that the intervention of the air particles has no effect on the extent of the ultimate decomposition of the complex hydrogen fluoride molecules corresponding to a particular diminution of pressure. The presence of the air may alter the rate of the dissociation, but it has no appreciable influence on its maximum amount. Lastly, they see in the fact that their values for the density at *circa* 32°, under ordinary atmospheric pressure, agree almost exactly with those obtained by Mallet, a proof that the nature of the vessel or the character of its surface exert no appreciable effect on the extent of the dissociative change, Mallet's experiments having been made in glass coated with paraffin, whereas those of the author's were made in a vessel of platinum. This point is of importance in view of Konowalow's experiments on the effect of surface in influencing the rate and extent of dissociation.

Professor Ramsay said that Professor Thorpe, in speaking of the analogy of the results obtained in the case of hydrogen fluoride with those of the Brothers Natanson for nitric peroxide, had pointed out that these latter afforded insufficient proof of the higher limiting value of n in the formula NnO_2n; and that this limiting value was also unknown in the case of acetic acid, of which the vapour-density also increased with fall of temperature. Now there were three separate lines of argument leading to a knowledge of the higher limiting formulæ of these bodies which had been pointed out by himself and Dr. Young, and of which the data were to be found in papers published in the *Philosophical Transactions*, in the *Philosophical Magazine* and in the *Chemical Society's Transactions*. The first of these has reference to the alteration of density of the saturated vapour with fall of temperature and corresponding fall of pressure. It is argued that the density of the vapour of a substance must necessarily, at any given temperature, be higher when the vapour is on the point of condensation than when it is unsaturated. Hence, if it can be proved that the density of the saturated vapour of bodies like nitric peroxide and acetic acid shows no signs of increasing beyond those required for the respective formulæ N_2O_4 and $C_4H_8O_4$, such formulæ must denote the limit of complexity of the molecules, in the gaseous state at least. To ascertain such a limit, Dr. Young and the speaker constructed from the Natansons' data for the relations of volume, pressure and temperature of nitric peroxide, and their own data for the vapour-pressure of that body, isothermal curves in which pressures formed ordinates and vapour-densities abscissæ. The terminal points of such curves are characterized by rapid increase of density without rise of pressure, and, in fact, denote that the substance is no longer in the gaseous state, the vapour-pressure of the liquid having been reached. The densities of the saturated vapour, therefore, will correspond with the angles of union of the isothermal curves wih horizontal straight lines representing condensation to liquid under vapour-pressures constant for each temperature. By joining with each other such angles of union for each temperature a curve is obtained expressing the densities of the *saturated* vapour in relation to pressure. It is evident from inspection of such a curve for acetic acid, shown in a plate in the Society's *Transactions* (1886, 806), that the line of zero-pressure would be cut at the density 60, corresponding to the formula $C_4H_8O_4$; a similar curve can be constructed from the Natansons' results and Ramsay and Young's determinations of the vapour-pressures of nitric peroxide, and this intersects the line of zero-pressure at a point corresponding to the vapour-density 92, equivalent to the formula N_2O_4. The second argument is as follows : Representing the relations of temperature and pressure of a "perfect" gas for any given constant volume, $p = c \,.\, t$, where c is a constant and t absolute temperature. This is the equation to a straight line; such a line is termed an *isochoric line* or *isochor*; its point of origin for a perfect gas is absolute zero of pressure and temperature. If a different volume be chosen, the slope of the line is different. Now it is clear that if a given volume of gas contains $2n$ mols., pressure will rise with rise of temperature at twice the rate that it would if the given volume of gas contained n molecules. Constructing for nitric peroxide and for acetic acid, on the assumption that they are perfect gases, diagrams showing the relations of pressure and temperature for the formulæ NO_5 and $C_2H_4O_2$, at such volumes that 1 gram occupies, say, 1000 cubic centimetres in each case, the resulting straight lines will manifestly differ in slope from those corresponding to the respective formulæ N_2O_4 and $C_2H_8O_4$, the pressure in the latter case not rising so rapidly with rise of temperature, owing to the smaller number of molecules in that volume. But we know that the actual behaviour of these bodies is not that of perfect gases. The line representing the relations of pressure and temperature should at high temperatures, when the substances exist in the molecular state NO_2 and $C_2H_4O_2$, nearly coincide with the theoretical line for these molecular states; and at low pressures and temperatures with the line denoting the molecular condition N_2O_4 and $C_4H_8O_4$. The data of actual experiments show that such is the case. The S-shaped isochoric curve trends, so that it is probable that it would become tangential with that expressing the behaviour of molecules of the higher formulæ, showing no signs of cutting it, as it must needs do, were still more complex molecules capable of existence. The third line of argument is derived from the application of Raoult's method to a solution of nitric peroxide in acetic acid; the results obtained by the speaker show that even with very varying proportions of peroxide the molecular weight corresponds closely with the formula N_2O_4. In conclusion, the speaker suggested that it was very desirable that the authors should, if possible, obtain data for a greater number of isothermals than the two which they had already constructed, so as to afford means for determining the true complexity of the molecule; and also that such results should be checked by the application of Raoult's method, dissolving the hydrogen fluoride in glacial acetic acid.

Professor Thorpe said that it was impossible to apply Raoult's method, on account of the violence of the action which took place on adding hydrogen fluoride to acetic acid.

Contributions to the Chemistry of Lignification; the constitution of the Jute Fibre Substance. By C. F. Cross and E. J. Bevan.—The authors describe the results of fuller study of the ligno-celluloses (compare *Chem. Soc. Trans.*, 1882, 90; 1883, 18). The substance of the jute fibre may be empirically represented by the formula $C_{12}H_{18}O_9$, and although an aggregate, its properties and composition are sufficiently constant to warrant its being regarded as a chemical unit. It is to a certain extent attacked and dissolved by hydrolytic agents, but the insoluble residues possess the com-

position and properties of the original; hydrolytic agents which are at the same time oxidising agents, *e.g.*, dilute nitric acid, however, cause its resolution into insoluble cellulose and soluble non-cellulosic acid products. On treatment with a mixture of concentrated nitric and sulphuric acids, it is converted into explosive nitrates, ultimately into what appears to be the tetranitrate, $C_{12}H_{14}O_5(NO_3)_4$. The characteristic action of chlorine, whereby ligno-cellulose is resolved into cellulose and a yellow chlorinated derivative, has been studied by a special method and apparatus, and it is shown that interaction takes place according to the equation $C_{456}H_{702}O_{342}+24Cl_2=6C_{19}H_{17}Cl_4O_9+57C_6H_{10}O_5+3H_2O+24HCl$. Previous observations showed the probable presence in the chlorinated fibre of mairogallol. A comparison of the composition of the latter with that of the chlorinated derivative, however, indicates that it is associated with another substance having approximately the formula $C_{137}H_{169}O_{59}$. Moreover, the chlorinated derivative has been found to contain a constituent yielding on hydrolysis furfural and acetic acid. These compounds are also readily yielded by the original ligno-cellulose, and the quantities obtained confirm the empirical formula deduced as above from the statistical comparison with mairogallol. The non-cellulosic constituent therefore appears to be composed of (*a*) a group, $C_{18}H_{18}O_{10}$—a ketone transitional to a quinone, capable of combining directly with chlorine to form mairogallol; (*b*) a furfural group, $C_5H_4O_2$, in combination by condensation with (*a*) and with (*c*), a group yielding acetic acid. These are associated in the approximate molecular proportions of (*a*) 2 (*b*) 6, (*c*) 5 = $C_{76}H_{80}O_{37}$. From the examination of various types of lignified tissues and fibres, the authors conclude that the composition of the ligno-celluloses in the earlier stages of growth approximates to that of jute; but that in the true woods, in which the carbon percentage is higher and the properties of which differ sensibly from those of the first named—condensation has proceeded further.

The Atomic Weight of Chromium. By S. G. Rawson, B.Sc.—The author has determined the equivalent of chromium by converting a known weight of carefully purified ammonium bichromate into chromic oxide: the chromate was first reduced by means of alcohol and muriatic acid, an excess of ammonia solution was then added to precipitate the chromium as hydroxide, the water was removed by evaporation, and after drying the residue at 140°, the ammonium salt was expelled by ignition in a muffle. All the operations were carried out in one and the same platinum dish; full details are given in the paper. The general mean of the experiments indicated the ratio of chromium to hydrogen to be 52·061.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

At a meeting of this Association on Thursday, February 27, the following paper was read:—

Gelatine Pill Coating.

BY C. SYMES.

It was my original intention merely to have made a miscellaneous communication on this subject, for the purpose of helping to fill up an evening, but Mr. Ward has persuaded me to write a short paper on the subject, and to show in operation the small machine by which we perform the process.

The pillular form of medicine has always been a popular one, and the subject of coating pills so as to render them tasteless, without impairing their activity, has been a study amongst pharmacists for a very long period. It is now nearly thirty years since Mr. Samuel Banner, then proprietor of the pharmacy in Hardman Street, now owned by my firm, read at a meeting of this Association a paper on coating pills, and shortly afterwards Mr. Proctor, of Newcastle, published his criticisms on the various processes that had been suggested. About the same period I was working at the subject at Leamington, and then thought, in fact still believe, that a decided advance was made by my suggestion to use the resin of tolue (a waste product from the manufacture of the syrup) in ether instead of the balsam, which had imperfectly accomplished the object, and to roll in fine powdered talc, so as to give a thin, steel-grey coating. But in those days no one thought it proper to load pills with a quantity of French chalk, such as is now used with impunity, and the process of gelatine coating, although well known, was not much in favour.

Mohr and Redwood's 'Pharmacy,' published in 1849, described and illustrated the method then recognised and adopted when it was desired to cover pills with gelatine. The pills were to be placed singly on the top of needles or ladies' hair pins, which latter were specially recommended, and after they had been dipped in a warm solution of one part gelatine in two of water, the opposite end of the needle or hair pin was to be stuck in a pincushion or a dish of sand. The next improvement on this simple means with which I am acquainted was that adopted by Mr. Delf, who was a member of this Association some twenty years ago. Too enterprising to be satisfied with the tedious method of picking up pills singly, he took pieces of cardboard about 4 by 4½ inches and pressed through them a number of pins of an equal length, cementing the heads on the opposite side of the cards, so that they were all kept rigid and in position. The distance between the pills was such that they would easily pick up the pills from the alternate grooves of a pill machine; six pins long and four wide enabled the operator to take up and dip twenty-four pills at a time with a fair amount of success, but occasionally the picking up was imperfect, or some of the pills would drop into the solution from not being firm enough on the pins; the size of the card, too, was somewhat large for the number of pills it held, and this was subsequently reduced.

Whatever faults this arrangement possessed, it worked so satisfactorily that Mr. Delf had a customer who brought pills to him to be coated; that is to say, a gentleman periodically got four dozen pills, on each occasion prepared by another pharmacist, from an old family recipe, for which he paid 2s., and brought them to Mr. Delf to be coated with gelatine at a further charge of 3s. I quote this circumstance to show that there were persons amongst the public then, as I believe there are now, who were willing to pay for skill and ability where such were to be found. More recently our American friends have taken up the matter in earnest; they have endowed pill coating with commercial enterprise, and have brought to bear upon it the skill of the engineer and mechanic, as well as the art of the confectioner and pharmacist.

Let it not be thought that I am about to advocate factory made articles *versus* home made products; but in passing I would emphasise, that if the pharmacist is to hold his own against these, or if he is to make progress amidst cutting competition, he must not only possess a thoroughly sound knowledge of his business and skill to apply the same, but he must have the means and appliances at his disposal to accomplish the objects desired. It is to one such means and appliance that I wish for a short time to direct your attention this evening.

Gelatine has been found, by carefully conducted experiments, to be the most soluble kind of coating in common use, which is of great advantage, whilst the contents or medicinal substance is, as a rule, well pre-

served for years. It is, however, contraindicated when the ingredients composing the pills are vegetable astringents, such as tannic and gallic acid, &c., for although the thin film of tolu resin, which I am about to recommend, prevents actual contact, yet when the pill begins to dissolve in the stomach an insoluble substance is doubtless formed. Such astringents as acetate of lead, sulphate of copper, &c., may be covered with gelatine or with the compound without practically diminishing the effect, as the very small quantity of gum in the coating is insufficient to act prejudicially. Let us next consider the condition in which the pills ought to be for gelatine coating.

They should be rolled from a well made mass and possess sufficient firmness to be retained on the needles during the process of dipping; then the surface should be fairly dry, so that the gelatine solution is not readily acted upon by it, which remark brings me to the only part of this process for which I claim any originality. If the pills are not well dried it is a common thing to find the medicinal substance more or less intermingled with the gelatine solution; if well dried, then they are rendered hard and the solubility is more or less affected. Now if the pills be first coated with a thin solution of tolu resin in ether (just as in the first stage of pearl coating) there is no necessity for drying; the solubility is unaffected, and the gelatine does not become acted on or act on the surface of the pill. Next arises the question as to what gelatine to use? There is, as you know, a wide range between common glue and Russian isinglass, and yet all the varieties included therein are gelatine. I do not think that of one maker is superior to all others, but it should be of good quality, and in deciding on the quantity it is necessary to bear in mind that the transparent varieties contain more moisture than the opaque; hence a larger quantity of the former has to be used to get the same viscosity as by the latter.

Having decided on one kind, it is well to use that regularly with a view to getting uniform results. The published formulæ for preparing the solution vary considerably. Redwood's 'Pharmacy' has it one of gelatine in two of water, but this is much too concentrated unless a more hydrated gelatine is used than I have yet met with. Parrish's 'Practical Pharmacy' passes a high encomium on gelatine coated pills, and gives a similar formula for the solution.

Dorvault's 'L'Officine' recommends equal parts of gelatine and jujube paste dissolved in an aromatic water to the consistency of syrup. Proctor's 'Lectures on Practical Pharmacy' takes little account of pill coating, and does not mention gelatine. Remington's 'Practice of Pharmacy' gives the following:—Gelatine (French, gold label) 2½ ozs.; powdered boric acid, 120 grains; mucilage of acacia, 2 fluid ozs.; distilled water, 7 ozs. Macerate the gelatine with the water until it softens, dissolve it by heat in a water bath and add the boric acid, then slowly add the mucilage and strain the mixture.

In the 'Art of Dispensing' (an excellent little book containing the latest information on such matter) Thompson's formula is given as producing a satisfactory solution; it is as follows:—

French gelatine	4 ounces.
Boric acid	2 drachms.
Gum acaciæ	1 ounce.
Water	40 ounces.

It is worth remark in passing that beginning with a strength of 1 in 2 we now get to that of 1 in 10.

With the machine here before you I received from the maker in the United States printed instructions for use which contain a formula, the proportion of gelatine being 1 in 4. It will, perhaps, be better to give these instructions in detail; they are as follows:—

"*Read carefully.*
Follow strictly.
Compound gelatine solution.

Gum arabic	2 drachms.
Water (cold)	1 ounce.
Mix and dissolve, then add—	
Cox's gelatine	1 ounce.
Water (cold)	2 ounces.
Simple syrup	1 ounce.

"Dissolve by heat, strain, and before dipping the pills heat the solution to 180° F.

"Pills to be coated should be firm and free from powder. For stock purposes they ought to stand not less than a week before coating. Pills containing soft extracts require more time. Set the gauge on the pick-up, so that the needles will enter the pills about one-sixteenth of an inch, sufficient only to hold them in place.

"When the solution is not less than 160° F. or more than 180° F. dip the pills, taking care *not to coat the needles*—draw the pills out *slowly* from the solution, revolve *quickly* in the hands three or four times, place on the drying cylinder, which should be kept revolving about *fifty revolutions per minute*, until the pills are dry enough to take from the needles without sticking together, but be sure and take them off before they are *hard dry*. Excessive care in dipping, use proper judgment in regard to the right time to remove the pills from the needles, have patience and persevere. 'If first you don't succeed, try again.' To sum up the whole business, use a heap of good, solid common sense, and in a very short time you will be surprised and delighted with your success."

There are, I believe, several sizes of this machine; the one we have here is the No. 2, driven by hand. It consists of ten needle bars, each carrying twenty-five needles in a single row, a long narrow copper water-bath for holding the gelatine solution, a grooved tray, with brass regulator for guiding the needles as to position and depth, called the "pick up," and on the opposite side of the same a notched plate for removing the pills from the needles; also a drying cylinder, into which the needle bars slide and are rotated. It is important to keep the needles quite clean, and to rub them with a little oil or vaseline each time after use. Probably the best pill to test the value of gelatine coating is phosphorus. I have no simple phosphorus pills which have been kept any length of time, but here are some, in combination with nux vomica, which were prepared more than five years ago, and on cutting them open, the presence of the phosphorus is almost as evident now as it was when they were newly made.

My experience indicates the following as the best mode of procedure: Roll the pill from a good stiff mass; coat thinly with a solution consisting of 1 ounce of resin of tolu in 5 fluid ounces of ether, without the use of powder of any kind; after fifteen or twenty minutes the pills may, by the use of the Porcupine or any similar machine, be coated with the following solution: Opaque gelatine (such as Nelson's or Star) 1 part; mucilage of acacia, 1 part; water, 5 parts; the gelatine to be soaked in the water for half an hour, dissolved in a water bath, and the mucilage added. There is no object in the addition of sugar, and nothing is gained by its use. The boric acid is only added to preserve the prepared gelatine in bulk, but I prefer to omit it and use the fresh solution when any quantity of pills for stock are to be coated. If it is desired to set it aside and use from day to day, the addition of a few drops of chloroform after each occasion answers the purpose quite well, and is driven off on rewarming. It must, however, be borne in mind that gelatine solution is weakened each time it is heated, the small quantity of phosphate of calcium which it holds in solution becoming precipitated, and so impoverishing its solidifying power and tenacity.

Since the issue of the Board of Trade regulations respecting medicine supplied for ships' use, which requires "all pills to be coated with gelatine," this subject has gained in importance, and must be of special interest to the chemists and druggists of a port like Liverpool.

ABERDEEN AND NORTH OF SCOTLAND SOCIETY OF CHEMISTS AND DRUGGISTS.

The members met in the Palace Hotel on Wednesday, Feb. 20, at 7.50 p.m. Mr. William Reid, President of the Society, in the chair.

The Secretary moved: "That the members associate on this occasion, William Gilmour, Esq., F.R.S.E., Chairman of the Executive of the North British Branch of the Pharmaceutical Society, as the representative of the Pharmaceutical Society."

This was unanimously agreed to.

The Chairman thereafter moved: "That a record of the evening's proceedings (the Jubilee Celebration) be entered in the 'Minute-Book' of the Society."

This was also unanimously agreed to.

The Jubilee celebration of the Aberdeen and North of Scotland Society of Chemists and Druggists was held in the Palace Hotel on the evening of Wednesday, Feb. 20, at 8 o'clock. Mr. W. Reid, President, in the chair.

Fifty-three ladies and gentlemen were present, and included, amongst others, Mr. and Mrs. Gilmour, Edinburgh; Mr. W. L. Howie, London; Mr. J. Bertie, Auchinblae; Dr. and Mrs. Moir, Dr. and Mrs. Presslie, Dr. and Miss Gordon, Dr. Watt, Mr. Broomhead, Mr. and Mrs. Coutts, Messrs. J. Cruickshank, Giles, W. Gordon, and Johnston, Junr,; Mr. and Mrs. Morrison, bailie, Mr. and Miss Paterson, Mr. S. Paterson, Mr. and Mrs. Ritchie, Mr. and Mrs. Ross, Mr. and Mrs. A. Strachan, Mr. and Mrs. J. E. Strachan, and Mr. and Miss Sutherland, Aberdeen.

Several apologies for absence were received.

After doing justice to an excellent repast, the usual loyal toasts were drank, followed by "Aberdeen and North of Scotland Society of Chemists and Druggists," proposed by Mr. Gilmour, and responded to by the Chairman; "The Representatives of the Founders," proposed by Dr. Presslie, and responded to by Mr. W. Gordon; "The Medical Profession," proposed by Mr. Howie, and responded to by Dr. Presslie; "The Pharmaceutical Society," proposed by Bailie Paterson, and responded to by Mr. Gilmour; "Our Visitors," proposed by Bailie Paterson, and responded to by Mr. J. Bertie; "The Ladies," proposed by Mr. Giles, and responded to by Mr. Broomhead; "The Chairman," proposed by Mr. Ritchie.

Mr. Gilmour, in proposing the toast of the evening, spoke in the highest terms of praise of the Society, on account of its having, even from its very commencement, kept steadily in view the education of its junior members, and the good fellowship of its senior, as the brilliant assemblage before him showed, and in replying to the toast of the Pharmaceutical Society, he as senior examiner in Scotland paid a high tribute to those presenting themselves from Aberdeen for a thoroughness and clear-headedness which was altogether to be envied. Mr. Gilmour also suggested that if at all possible a representative from this district should be returned to the London Council.

The Chairman, in replying to the toast of the evening, and Dr. Presslie in proposing, and Mr. Gordon in replying to the toast of the "Representatives of the Founders," gave some interesting narratives of the manners and customs of the trade of fifty years ago, and expressed their regret that the only surviving founder (Mr. C. Davidson, of Forrester Hill), felt himself compelled to decline to be present at an evening meeting. Messrs. Giles and Broomhead, in their usual happy style, did justice to the toast of "The Ladies," who seemed quite impatient to fall before the shrine of Terpsichore.

With song, sentiment, and dance an evening which comes only once in fifty years seemed far too short, and the company parted, hoping that those spared to celebrate the centenary might have an equally happy, pleasant and enjoyable meeting.

GLASGOW CHEMISTS' AND DRUGGISTS' ASSOCIATION.

Assistants' Section.

A meeting of this Association was held on Monday, February 25, when a lecture was delivered by Professor Sexton on "John Dalton and the Atomic Theory." At the conclusion of the lecture, on the motion of Mr. Gilmour, a hearty vote of thanks was accorded to the Professor.

Parliamentary and Law Proceedings.

Child Poisoned by Soothing Syrup.

Mr. D. Wightman held an inquiry at Carbrook, into the circumstances attending the death of Beatrice Stevenson, age four weeks and five days.

The father said the child had been healthy. On Wednesday she had the stomach-ache, and some cordial was fetched from the shop of Mr. Appleton's, Hill-top. Witness gave the child about half a teaspoonful. Neither he nor his wife could read, but a girl who fetched it could read a little. He did not know what the dose was, and he guessed it. He put half a teaspoonful of the cordial in two spoonfuls of warm water and gave it to his daughter. In five minutes he saw it had made a difference to the child, who wanted to go to sleep. They became alarmed, and a doctor, who was sent for, said there was opium in the mixture. The child died next morning

The Coroner said Mr. Kirkpatrick, the surgeon who attended the child, wrote saying he found the child in a comatose condition, due to narcotic poisoning, which was the cause of death.

(To the man): You mean to say you have no more sense than to give this child a half-teaspoonful, and you did not know what it was? It might have been prussic acid.

Witness made no answer, but in reply to further questions said this was the first child he had lost. He had never given any cordials to the children before. He was recommended to give it by a Mrs. Walker. The child was insured a week ago, but he would not get anything.

Sarah Stevenson said she went to Appleton's for some anodyne cordial, and purchased a pennyworth. Mr. Appleton did not tell her the dose. She did not see the stuff given to the child.

The Coroner said he had received a letter from Mr. Appleton, which stated that the anodyne cordial was composed of opium, treacle, oil of sassafras and spirits of wine. Each fluid ounce contained 2¼ grains of opium. The dose for a child a month old was 10 drops, as indicated on the label, and that was a perfectly harmless dose. He had made and sold the preparation for a many years, and no casualty had occurred before. He might say that he always discouraged the use of anodyne and opiates for children of tender years or infants. The Coroner said the dose given was as much as it was safe to administer to a six months' old child. They had probably heard his opinion before about soothing syrup, which killed thousands of children, and ruined the constitutions of thousands more. The latter instead of growing up healthy men and

women were ill and delicate, and of the two he thought those were more fortunate who were killed. The stuff was well called soothing syrup, and it did soothe a good many children most effectually. Putting a label on the bottle when the people could not read was of no use, and what Mr. Appleton ought to have done was to ask people if they could read. If they could not he ought to make inquiries and tell people the proper dose. It was thoroughly explained how the child came to its death, and they (the Jury) could only put it down to the gross ignorance of the parents of the girl, and the dangerous commodity which was sold to ignorant people without making them acquainted with what they were buying. It was only a case in a thousand. The Legislature, in his opinion, ought to place laudanum under the Sale of Poisons Act.

Mr. Appleton was then called in, and said he sold the girl the stuff without asking whether she could read, or telling her what the doses were. He made a practice of doing so, but on this occasion he mistook the girl for a regular customer.

The Coroner read the latter part of the letter, where Mr. Appleton said he discouraged the use of anodyne and opiates. He (the coroner) did not see how Mr. Appleton reconciled that with the fact of his selling it, as he said he had done, for years.

Mr. Appleton said it had been made and sold by himself and father for thirty years, and it was harmless if used in a proper dose.

The Coroner said if the people could have read the doses in all probability the inquiry would not have been held.

Mr. Appleton said he always took great care, and there were dozens of cases where he had refused to sell it to the people.

The Coroner said if Mr. Appleton was in his position he thought such an impression would be made on him by the deaths caused by the use of soothing syrups that he would never sell another drop as long as he lived.

A verdict of "Death from an overdose of laudanum in soothing syrup" was returned.

Alleged illegal Sale of Strychnine Vermin Killer.

At Salford, Mr. Thomas Jackson, chemist, of Great Ducie-street, Strangeways, was summoned before Mr. Makinson, for having, on February 6th last, within 500 yards of the borough of Salford, unlawfully sold a certain poison, to wit, strychnine, being a poison named in the first part of the schedule A, in the Pharmacy Act, 1868, to Mary Ellen Kerwick, who was then a person unknown to him, and not introduced by some one known to him.

Mr. A. Holmes, deputy Town Clerk, prosecuted on behalf of the Watch Committee, and Mr. W. H. Glayser, of Birmingham, defended.

Mr. Holmes said the defendant was a large wholesale and retail chemist in Great Ducie-street. The schedule of the Act mentioned in the section contained the word strychnine, and the Act stated that no person was to sell any of the poisons mentioned in the schedule to a person unknown to the seller unless introduced by some person known to the seller. The prosecution contended that the knowledge of Mr. Jackson was not sufficient to warrant him selling any such dangerous compound.

Evidence was given by Inspector Wilson, who proved that the defendant acknowledged he did not know the name of the purchaser, and by Mr. Carter Bell, who said that the packet of vermin powder sold to the young woman, Mary Ellen Kerwick, contained 10 per cent. of strychnine.

Mr. Glayser, for the defence, urged that the entries made in "the poison book" of the defendant, and the signature of the young woman were sufficient compliance with the Act. Further, the defendant was unable to give evidence, and could not state how he knew the young woman, and therefore the prosecution should prove their case very clearly.

The magistrate said he thought the defendant knew the woman within the meaning of the Act, or rather that the prosecution had not properly proved that he did not do so; and, therefore, the case would be dismissed.

The Employment of Young Persons.

Mr. William G. Taplin, a chemist, of 91, Hampstead Road, has been summoned by Thomas Mann, the assistant secretary to the Shop Hours' Regulation Act Committee, for employing a young person under the age of 18 years for more than seventy-four hours during each of the weeks ending 19th and 26th of January, and further for not exhibiting a copy of the Act of Parliament in a conspicuous place in his shop.

Defendant pleaded guilty to not exhibiting a copy of the Act, and was fined 7*s*. But the magistrate held that the other offence charged was not proved by the evidence offered, and dismissed the summons.—*N. W. District Advertiser.*

Correspondence.

Aconite Root.

Sir,—The observations made in the *Pharmaceutical Journal* by M. F. Ransom last week seem to me to indicate that the cultivation of aconite root of good quality in this country is a matter of considerable difficulty and not likely to repay those who undertake it. I may perhaps venture to point out a few facts which militate against such an idea.

As regards price, it is a fact that English grown biennial henbane fetches at the present moment about eight times the price that the exotic drug obtains in this country. The cheap henbane has by no means extinguished or handicapped the sale of the more expensive article. Even if carefully dried English grown aconite were sold at 4*s*. the pound, it would only bear the same ratio to the German drug.

As there are no other wild species of aconite in this country, beside *A. Napellus*, it is not likely to hybridize if grown in the mountainous districts of Scotland, England, or Wales. In Scotland aconite may be seen flourishing in many of the little gardens at the Railway Stations in the Highlands, and in such districts it could doubtless be grown at very little expense.

The statement that plants which had been cut down in the summer were again grown up and in flower in the autumn by no means tallied with my experience, and in view of the fact that the root is generally exhausted after flowering, must be extremely exceptional.

Aconitum Fischeri cannot replace *A. Napellus* for internal administration, if, as stated on the authority of Professor Bartholon, in Lloyd's 'Drugs and Medicines of North America' (p. 231), the former affects the heart in an opposite mode to *A. Napellus*. The method of gauging the value of any given sample of aconite root by taste has only been suggested by Dr. Squibb, myself and Mr. Squire, in the absence of any better method; no one will be more grateful to Mr. Ransom than myself if he will follow up his admirable work on belladonna by researches on aconite root, and point out to the pharmaceutical world a good chemical method of estimating the value of aconite root.

E. M. Holmes.

Errata.—Benevolent Fund List of Subscriptions.—Page 689, F. W. Kent, East Molesey, should be 10*s*. 6*d*.; page 692, C. Hawood, Liverpool, should be C. Haywood.

Communications, Letters, etc., have been received from Messrs. Jenson and Langbeck, Umney, Cole, Baxter, Bancroft, Thorburn, Wilkinson, Wood, Taylor.

THE ASSAY OF IPECACUANHA.

BY R. A. CRIPPS, F.I.C., AND A. WHITBY.

Few drugs have attracted more attention from the scientific investigator than ipecacuanha, but notwithstanding the great amount of work done, there is still some considerable difference of opinion as to which is the best method of estimating the quantity of the active principle, emetine.

It is with the hope of arriving at some definite conclusion with respect to this question that we have undertaken the examination of some of the most popular methods, with a few others of an original nature.

Emetine was discovered in 1817 by Pelletier and Magendie, but as described by them consisted of the alkaloid with a very large proportion of some of the other proximate constituents of the root.

In 1869 Attfield showed that this alkaloid (?) was very impure, and described a method of assay, which, however, still gave results far in excess of the truth.

Since that time, other chemists have obtained emetine in a state of greater or less purity; amongst others, Flückiger has stated that pure emetine is yielded to the extent of not more than 1 per cent. He obtained the alkaloid fairly pure by mixing the finely powdered root with milk of lime, drying and exhausting the dried powder with boiling ether, benzin, or chloroform.

More recently (*Ph. Zeitung*, Jan. 13, 1886, p. 30), Flückiger has emphasized his former statement, saying that all results giving more than 1 per cent. of emetine are in almost all cases due to faults in the titration, or to defective methods of analysis. He describes still another process as follows:—From 10 to 15 grams of the drug in fine powder are exhausted with boiling chloroform to which one drop of solution of ammonia (·920) has been added; the exhaustion is known to be complete when Mayer's solution no longer gives a precipitate if added to acidulated water which has been shaken with the last portions of the chloroform. The chloroform is distilled off, and the residual alkaloid, which is nearly pure, is weighed, or titrated with Mayer's solution.

Dragendorff recommends the following method of Zinoffski:—Mix 5 grams of the finely powdered drug with 5 times its weight of water containing sulphuric acid, 1 minim to each gram of drug, macerate twenty-four hours, add 25 grams of alcohol and digest forty-eight hours. The liquid is filtered, an aliquot part taken, evaporated to remove alcohol, diluted, filtered, and titrated with Mayer's solution, 1 c.c. of which is equivalent to 0·0189 gram of emetine.

In the *Pharmaceutical Journal*, [3], xvi., p. 627, appears a paper by Lyons, in which the author reviews the various methods of assay, and shows that Dragendorff's method gives the highest results; but he recommends a slight modification of Dragendorff's method of manipulation, and himself proposes the two following processes as being fairly accurate and rapid:—

a. Place in a small corked flask (capacity about 50 c.c.) 2·5 grams accurately weighed of ipecac in fine powder, and weigh flask, cork, and contents. Nearly fill the flask with a mixture of ether 250 parts, ammonia 10 parts, and alcohol 20 parts; set aside, shaking occasionally, for twenty-four hours. Now weigh the flask and its contents before removing the cork; decant as much as possible of the clear liquid, taking care to operate rapidly to avoid evaporation. Immediately cork the flask and re-weigh. The alkaloid may now be separated from the decanted portion of ether by agitating repeatedly with acid water, and again washing out from the aqueous solution rendered alkaline by ammonia, with chloroform. Identical results can, however, be attained more rapidly by merely evaporating the ether after addition of water containing 10 minims of 6 per cent. sulphuric acid and titrating the aqueous solution (made up to 20 c.c.) with Mayer's reagent. The calculations need no explanation.

b. Place in a flask 5 grams of finely-powdered root; add a mixture of strong ammonia 1 gram, alcohol 5 grams and chloroform 30 grams; set in a warm place half an hour, then keep the mixture boiling for one hour, and add 50 c.c. of petroleum benzin, boil half an hour, add benzin enough to make the mixture measure nearly 100 c.c., filter, and add through the filter sufficient benzin to make up to 100 c.c.. Of this take for the assay 25 c.c. and treat as in the ammoniated ether method.

Lyons found the average of 48 samples to be about 2·5 per cent.

Shortly after this, H. W. Jones read a paper at the meeting of the British Pharmaceutical Conference at Birmingham, on the estimation of emetine. He says of Flückiger's method, "It appears to give *complete* exhaustion of the root, and the alkaloid is obtained in an *unaltered* condition; in all samples I have examined I have found the residue from the chloroformic solution imperfectly soluble in acidulated water." Mr. Jones also investigated the subject of titration by means of Mayer's solution, and pointed out that in order to obtain correct results, the solution of the alkaloid must approximate to the strength of 1 in 500. He further states, "Ipecacuanha has been frequently reported as containing 3 or more per cent. of alkaloid, whilst the average amount of emetine in good samples *does not greatly exceed* 1 *per cent.*"

Ransom, however, in a paper read at the following meeting of the Conference in Manchester (1887), speaking of Flückiger's statement, says, "I have myself obtained a considerably higher percentage than that mentioned" (1 p. ct.). Mr. Ransom conducts Flückiger's process in a Dunstan and Short's extraction apparatus, using 20 grams of root in No. 60 powder, and he finds 5 columns of boiling alkaline chloroform sufficient to completely exhaust the root of alkaloid. He showed, as indeed had Mr. Jones, that the residue obtained by simply evaporating the chloroformic solution to dryness was far from pure emetine. Both operators dissolved this residue in diluted acid, and extracted the alkaloid by shaking out with chloroform after rendering alkaline with ammonia. Ransom states that the alkaloid even thus obtained was not quite pure, it contained about 20 per cent of impurities. By shaking out with dilute acid from the ammoniated chloroform solution and titration with Mayer's solution, he, however, obtained slightly higher results. Having some fear lest the continuous contact with the alkaline chloroform might decompose a portion of the alkaloid, Mr. Ransom made two estimations of a sample of ipecac., in one of which the root and solvent were left in contact for four weeks, while in the other the entire estimation was

completed in the course of a few hours. The difference in the quantity of alkaloid obtained amounted to only 0·02 per cent. Mr. Ransom found a variation from 1·3 per cent to 2·3 per cent. of emetine, the mean being 1·66 per cent.

From this short summary of the results of previous workers it will be seen that there is a great difference of opinion, not only as to the method to be employed, but also as to the amount of emetine actually present in ipecacuanha.

1. The early observers found large percentages (seldom less than 6 per cent.) of impure emetine.

2. Flückiger by the lime method found ipecac. seldom or never yielded more than 1 per cent. pure emetine.

3. Flückiger by the ammoniated chloroform method found about 1 per cent.

4. Jones, working by Flückiger's process, reports that the *average* of emetine in good ipecacuanha does not greatly exceed 1 per cent.

5. Lyons, using Dragendorff's process, reports upon 48 samples as follows :—5 contained less than 2 per cent. ; 10 between 2 and 2½ per cent ; 23 from 2 to 3 per cent ; and 10 more than 3 per cent.

6. Ransom, using Flückiger's method, gives 1·66 per cent as the average of 12 samples, maximum 2·3 per cent., minimum 1·3 per cent.

From the various processes proposed we have selected those of Dragendorff (as modified by Lyons), Flückiger's ammoniated chloroform method, and Lyons's ammoniated ether method, and have compared them with similar processes, using acetic ether, chloroform acidulated with glacial acetic acid, and various mixtures of these solvents. Lyons's ammoniated chloroform and benzin process we tried, but found so unsatisfactory that we soon gave it up ; we found that after treatment with this solvent as described by him, acetic ether still removed abundance of emetine. Flückiger's lime method we did not use, because the author, having since replaced it by the ammoniated chloroform process, indicates that he considers the latter an improvement. Some of the extractions were conducted in flasks, as directed by Lyons, others by simple percolation, and others again by hot percolation in a Dunstan and Short's extraction apparatus, using the same sample of root in every instance.

The following table shows the results :—

Number.	Solvent employed.	Method of extraction.	Per cent. alkaloid by weight.	Per cent. alkaloid by titration with Mayer's solution.
1.	Dragendorff's (Lyon's mod.)			2·23
2.	Ammoniated chloroform.	Cold percolation	1·98	1·76
3.	,, ,,	Hot ,,	2·05	1·49
4.	,, ,,	,, ,,	—	1·62
5.	Chloroform with 1 per cent. glacial acetic acid.	Cold ,,	2·32	2·12
6.	,, ,, ,,	Hot ,,	2·27	2·04
7.	Lyon's ammoniated ether.	Flask	2·88	2·38
8.	,, ,,	Cold percolation	2·72	2·29
9.	Acetic ether.	Flask	2·6	2·01
10.	,, ,,	Cold percolation	2·58	2·13
11.	,, ,,	Hot ,,	2·49	2·01
12.	,, ,,	,, ,,	—	1·98
13.	Acetic ether and glacial acetic acid (4 per cent.).	Cold percolation	2·5	2·17
14.	,, ,, ,,	Flask	2·64	1·94
15.	Acetic ether 25 c.c., chloroform 23 c.c., glac. acetic acid 2 c.c.	Cold percolation	2·45	lost
16.	,, ,, ,, ,,	Hot ,,	2·42	2·03
17.	Acetic ether 25 c.c., chloroform 23 c.c., liq. ammon. fort. 0·25 c.c.	Cold percolation	—	1·49

These results are instructive ; but before proceeding to draw any conclusions we will describe the method of working, to render the table intelligible.

When the extraction is conducted in a flask, the process is carried out exactly as described by Lyons for the ammoniated ether method. This is, however, only applicable when solvents of low specific gravity are employed ; otherwise the powder floats, consequently the solvent cannot be removed clear, and filtration is inadmissible on account of the evaporation incurred.

When exhausted in an extraction apparatus the solvent is allowed to percolate through the powder five or six times, when the removal of the emetine is complete. The extraction by cold percolation is conducted in the usual manner, as described later.

The solution obtained in either of the above ways is introduced into a separator, agitated with very dilute sulphuric acid (if an acid solvent has not been employed, when distilled water may be used for the first washing), and the alkaloid removed by acid washing as usual. This acid solution is then treated with ammonia and ether, washed three times, and subsequently twice with chloroform. The mixed ether and chloroform solutions are washed with water, evaporated, and the residue dried on a water-bath. The residue consists of nearly pure emetine, and is weighed. It may then be dissolved in water containing six drops of 5 per cent. sulphuric acid, diluted to 20 c.c. with water, and titrated with Mayer's solution, half the usual strength. The number of c.c. employed multiplied by 0·00945 gives the weight of pure emetine in the quantity of root taken (described in table as alkaloid by titration).

By inspecting the table it will be seen—

1. That with the exception of Lyons's ammoniated ether process, the other cases in which ammonia was employed in exhausting the drug, the amount of emetine obtained was considerably below the average. This would seem to be in contradiction to Ransom's crucial test as to the influence of ammonia, but we have found the same fact to obtain so frequently that we feel no doubt as to the prejudicial effect of ammonia.

2. The use of heat in the original exhaustion is

to be avoided, the results being lower in each case when it was employed, except No. 16, than in the corresponding assays in the cold.

3. The results obtained in each case when an acid solvent or acetic ether alone was employed agreed very closely, if those of the same method of extraction are compared. By cold percolation the percentages are 2·12, 2·13 and 2·17 ; hot percolation 2·04, 2·01, 1·98 and 2·03.

4. Dragendorff's method gives much the same results as Lyons's ammoniated ether process, both being rather higher than the acetic ether titrations.

During the use of these various processes, several points of importance have been noticed :—

1. Most workers recommend chloroform to be used for the purpose of extracting the emetine from the alkaline aqueous liquids. *We find ether to be far* better ; it dissolves the precipitated emetine more readily and separates more rapidly. We, however, employ a little chloroform to remove the last portions of alkaloid, which are apparently retained by the ether dissolved in the watery liquid.

2. When chloroform is used as a solvent to exhaust the root some other substance is extracted with the emetine which is precipitated when acid water is mixed with it in the separator, forming a partial emulsion ; the separation is then very tedious. This is particularly the case when heat is employed in the first exhaustion of the drug, and ammonia also appears to increase it.

3. When the solvent as it comes from the drug is evaporated, and the residue dissolved in acidulated water and titrated direct with Mayer's solution, the result is usually slightly lower than when the process is carried out as we have described farther on. The difference is, however, so slight, if the least possible exposure to heat be allowed, that when time is a matter of consideration this plan may well be adopted.

4. When the finely powdered root is treated with any of the solvents mentioned, with the exception of that used for Dragendorff's process, we have found that although the drug may be so fully exhausted that 10 or 12 drops of the liquid coming from the percolator, give, after evaporation and solution of the residue (if any) in very dilute acid, no precipitate with Mayer's solution, but only the faintest opalescence; yet, if subsequently treated with dilute spirit, either alone or with addition of lime, this solvent still extracts some substance which gives a precipitate with Mayer's solution. This, contrary to the experience of Mr. Ransom with ammoniated chloroform, we have found to be the case constantly with many samples of the root. We think this further precipitation must be due to some principle, alkaloidal or otherwise, which is not emetine, and we hope to continue the research in this direction, working with a larger quantity of material. This fact no doubt accounts for the high results obtained by Lyons and others, who have used the process of Dragendorff, they having naturally included this unknown substance in the titration as emetine.

5. After the experiments here recorded were nearly completed, we had reason to entertain doubts as to the advisability of using heat during the evaporation of the alkaloidal solution, and drying of the residue obtained. Accordingly, ·212 gram of emetine was dissolved in about 24 c.c. of chloroform, and 5 c.c. of the solution introduced into each of four weighed flasks, a trace of moisture introduced with each, and each evaporated at a low temperature (about 120° F.), the vapour being aspirated from the flasks continually. They were then treated as follows :—

Flask A. Residue gently warmed on a water-bath for three minutes, to dissipate remaining chloroform, aspirated, and dried over sulphuric acid (5 hours).

Flask B. Dried on a water bath for 1 hour.
Flask C. ,, in air-oven at near 160° F. for 2 hrs.
Flask D. ,, ,, ,, 240° F. for 1½ hrs.

Each flask was then weighed, the residue dissolved in acidulated water and titrated as usual. The results are shown in the following table :—

Flask.	Nature of solution.	Weight of alkaloid. grm.	Alkaloid by titration.
A.	Perfectly soluble, colour of pale brandy	0·0454	0·0411.
B.	,, ,, very slightly darker	0·046	0·0392.
C.	,, ,, colour of solution "B"	0·0463	0·0383.
D.	much insoluble, colour red-brown	0·0447	0·0265.

From these figures it will be seen that the application of heat scarcely at all effects the weight of the alkaloidal residue, but a distinct reduction occurs in the quantity found by titration. This fact accounts for the low results obtained when heat is used in the extraction, and from our results it is evident that heat is more prejudicial when the alkaloid is free, as in the ammoniated chloroform method, than if combined, as when acetic solvents are employed. In consequence of this, we have now abandoned as far as possible the use of heat throughout the assay of ipecacuanha, as described further on. This fact, too, explains the destruction of alkaloid, which occurs when ipecacuanha wine is made according to the B.P. method.

From the results of these recorded experiments, and many others not given, we conclude—

1. That of the methods yet proposed the process of Lyons with ammoniated ether is to be recommended as most fully exhausting the drug, at the same time being rapid in execution. We, however, prefer to conduct the extraction by cold percolation, thereby avoiding so many weighings, the exhaustion being fully as complete.

2. That the ammoniated chloroform of Flückiger is decidedly objectionable.

3. The use of acetic ether alone, acetic ether with 1 per cent. of glacial acetic acid, or acetic ether, chloroform and glacial acetic acid is attended with good results ; the extraction is perhaps rather more rapid than by Lyons's solvent, and throughout the process works well. It is carried out thus :—2·5 grams of ipecacuanha root in fine powder are introduced into a small glass cylindrical percolator about 200 m.m. long, and 11 to 12 m.m. internal diameter, very lightly shaken down, and a loose plug of cotton-wool placed on the surface of the powder. 10 c.c. of the solvent are now poured on and allowed to soak through the powder, care being taken to observe if any air spaces or channels exist in any portion. When the fluid begins to drop from the percolator, the *upper* open end is securely corked to prevent any further flow of the liquid, and the whole allowed to macerate for about two hours or preferably over night. Percolation is then proceeded with until about 50 c.c. of percolate is obtained or the root is exhausted ; this is the case if six to ten drops of the liquid, when evaporated, and the residue dissolved in dilute sulphuric acid, give no precipitate with Mayer's solution.

The solution thus obtained is introduced into a separator, and washed with *four* successive quantities of slightly acidulated water (about 8 c.c. at a time). The aqueous liquid now containing the emetine is washed once with ether while still acid, then rendered alkaline with ammonia and washed *three* times with 6 c.c. of ether, followed by two successive washings with 6 c.c. of chloroform. The mixed ethereal and chloroformic solutions are washed once with water, then evaporated in a current of air, and dried by exposure over sulphuric acid for some hours; it is then weighed, dissolved in 20 c.c. of water acidulated with six drops of 5 per cent. (by volume) sulphuric acid, in which it should be almost entirely soluble, and titrated with Mayer's solution (half strength) in the usual manner; 1 c.c. =0·00945 grm. emetine.

This is the method we recommend when strictly accurate results are required, but for general use it is frequently of importance to save time even at a slight loss of accuracy. This saving of time may be effected either by drying the final residue on a water-bath for one hour only, when the amount of alkaloid found by titration will be slightly below the correct percentage; or by dissolving the emetine obtained, without previous drying, in dilute acid and titrating; or, finally, by shaking out the alkaloids from the original acetic ether solution by acid water, using, however, four washings of only 5 c.c. each (to make the final bulk only 20 c.c.) with six drops of 5 per cent. sulphuric acid in the whole, warming the solution gently to remove dissolved acetic ether and titrating with Mayer's solution. These alternatives have the disadvantage of not allowing *two* results in the same estimation, which serve as a check upon each other.

The experiments recorded above were all performed upon the same sample of root; since these were completed further experience of the use of acetic ether by cold percolation has served to increase our confidence in that solvent, the results being always *very* close to those by Lyons's method; it is of great importance that the dimensions of the percolator should be such as described if the same quantity of powder be operated upon.

Since the adoption of the acetic ether as a solvent the *average* percentage of emetine found in ipecacuanha has been considerably higher than when we employed ammoniated chloroform, as shown by the following record from the laboratory journals.

By ammoniated chloroform impure alkaloid weighed 1·60, 1·57, 1·85, 1·52, 1·52, 2·05, 1·82, 1·94, 2·65, 2·56, 2·90, 2·09: av. of 12 samples 2·00 per cent.

By alkaloid by titration, 1·16; 0·94; 1·17; 0·94; 0·89; 1·20; 0·93; 1·23; 1·46; 1·51; 1·75; 1·34. Average of 12 samples 1·21 per cent.

By acetic ether, alkaloid by titration, 2·6; 2·5; 2·7; 1·9; 1·63; 1·85; 1·7; 1·13; 2·18; 1·85; 1·76; 1·80. Average of 12 samples 1·97 per cent.

Lastly, it has been stated by Flückiger and others that the woody portion of ipecacuanha root is practically inert. In order to prove the accuracy or otherwise of this statement we estimated the amount of emetine in the woody column from which the cortical portion had been separated; the *whole* root assayed 2·40 per cent. by Lyons's method, the wood alone, which amounted to about 15 per cent of the total weight of the root, 0·8 per cent., that is about 5 per cent. of the total emetine present in this sample existed in the woody column.

The Pharmaceutical Journal.

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Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

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JOHN WILLIAMS.

BY the death of Mr. JOHN WILLIAMS, which it falls to our lot to record this week, the pharmacists of this country have lost one to whom they were greatly indebted, and who is worthy to be associated in the history of the craft with the succession of able men by whom it has been served so disinterestedly during the last half century. With a sound practical knowledge of pharmacy and an unusual familiarity with the sciences upon which it is based, he combined a business capacity and perseverance that enabled him to do his share in developing a prosperous business, and this having been accomplished he for the long period of seventeen years devoted no inconsiderable amount of attention and energy as a member of the executive of the Pharmaceutical Society to the advancement of the interests of the calling of which he was a follower. Sagacious and business-like, yet patient, considerate and generous, he commanded the respect of his colleagues on the Pharmaceutical Council, who conferred upon him the honour of the Presidency for three successive years. Nor was he less loved and respected in the sister association, the British Pharmaceutical Conference, of which he also became President. Mr. WILLIAMS was also a worthy representative of the scientific side of pharmacy, though his unpretentious manners tended to mask, except towards those who knew him intimately, his wide and thorough knowledge. This side of his character is, however, put in evidence in the list of his published papers that is given on another page, most of which are marked by the practical application of scientific knowledge in the improvement of the art of preparing medicines. Take, for instance, the series of three papers relating to salicylic acid and allied bodies. In the first of these Mr. WILLIAMS announced that he had prepared from the then recently-introduced synthetically-prepared salicylic acid, a salicylate of methyl which was identical with that which had hitherto been prepared from oil of wintergreen, and he indicated the possibility of the artificially-produced compound becoming a successful rival of the natural one, an anticipation that has been fully realized. In the second paper, he

attempted to deal with a difficulty in connection with doubts that had arisen as to the occasionally abnormal action of samples of salicylic acid or the sodium salt, and described the preparation of a crystalline sodium sulphosalicylate which he thought would be more readily amenable to complete purification. In the third paper it was demonstrated that the alleged different action of the artificial salicylic acid then supplied was at least coincident with a crystalline form different from that of the acid prepared from oil of wintergreen, and it was also shown that the former could be brought into the natural crystalline form by a process of purification that separated a contaminating body which he called cresyl-salicylic acid. Not only were these papers creditable from a chemical point of view, but there can be little doubt that they had a beneficial influence upon the production of a most valuable medical agent. In another series of papers, touching the border-land of applied physics, Mr. Williams proposed to utilize the viscosity of glycerine to retain volatile substances, such as hydrocyanic acid and ethyl nitrite, in solution. This work, no doubt, was mainly the result of good training received whilst young, and the School of Pharmacy in Bloomsbury Square may claim with pride that early on the roll of its pupils and prizemen stands the name of John Williams.

THE SALE OF MEDICATED WINE.

The decision given at the Bradford Quarter Sessions by the Recorder in regard to the sale of "medicated wine" some weeks since is one that calls for special consideration by retail chemists. The case was an appeal against the decision of the borough magistrates, who had held that an article described as a "medicated wine" was not wine within the meaning of the Act which provides that retailers of wine shall have an excise licence. The article in question was sold in pint bottles made up by the proprietors, and was sold in that condition by the retailer proceeded against for infringement of the law by selling it without a wine licence. It was admitted to contain upwards of 80 per cent. of wine, but as there was also an admixture of other ingredients intended to have a medicinal effect, it was contended in support of the magistrates' decision that it could not be regarded as wine in the ordinary sense, and therefore that its sale ought not to be held subject to the provisions of the licensing Act. However, the Recorder declined to adopt that view of the case, and decided to reverse the decision of the magistrates' and allowed the appeal, though with a considerably mitigated penalty on the retailer. This decision has raised a question as to the position of chemists who supply any of the numerous "medicated wines" which are now made popular by advertisements in the newspapers. As a result of the notoriety thus acquired for these preparations the chemist is naturally often applied to for them, and he is, in fact, compelled to supply them. It is unnecessary here to enter into the question as to the merits of these preparations or to consider whether they are always to be regarded as fulfilling the advertised representations by which the notice of the public is attracted. It appears that under the conditions of their sale as packetted articles it is in no way the business of the retailer to inquire into the nature of the articles or to examine the contents of the bottles. His business is simply to deliver the packets to the purchaser in the same condition that they are supplied to him by the makers or their agents. But the Excise authorities are in a very different position; one of their duties is to enforce the law relating to the sale of wine by retail, and according to the existing state of the law it appears that a licence is required for the sale of every description of wine, whether medicated or not. Consequently they consider that it is their business to examine every article offered for sale with the designation of wine and to ascertain whether its sale is to be made subject to the provisions of the statutes relating to this matter. It is thus that the retail chemist supplying "medicated wine" with perfect *bona fides* becomes liable to be held accountable for a breach of the law, and as the case now stands it appears to us that the only mode of ensuring exemption from that contingency and at the same time the capability to satisfy the demands of his customers would be to take out a licence for the retail sale of wine not to be consumed on the premises where it is sold. There is only one case in which there is admitted to be an exception to this general necessity in the sale of medicinal wine, and that is the quinine wine of the British Pharmacopœia, which, by a special concession of the Board of Inland Revenue, is allowed to be sold without a licence when it contains at least one grain of quinine to the fluid ounce; the reason being that it is not then capable of being used as a beverage, and this would probably be held with regard to the other medicated wines of the Pharmacopœia.

But while we are constrained to recognize the necessity under existing conditions of the retailer's wine licence, as above stated, we do not hesitate to express the opinion that from a pharmaceutical point of view it is extremely undesirable that chemists should be the holders of wine licences, or that any features of their business should be of such a nature as to induce the Excise authorities to compel them to take out such licences. In the first place, the conditions under which these licences are to be obtained are such as to place the applicants for them in the same category as the ordinary retailers of intoxicating beverages. It is in that position they would have to apply to

the local magistrates for a certificate authorizing them to take out a retail wine licence, and by doing so they would place themselves to a certain extent under the supervision of the magistracy, and their agents, the police. We are here speaking of the licence which costs £2 10*s.* 0*d.* a year, and it must be added that some of the above mentioned inconveniences might be avoided by taking a wine-dealer's licence, costing £10 10*s.* 0*d.* year, which enables the holder to sell wine in any quantity for consumption off the premises. But even in this case the radical objection to the pharmacist being the holder of a wine licence would still hold, inasmuch as the position is one inconsistent with the nature of his business, and one that might lead to undesirable development.

Having said so much it will be necessary to furnish an answer to the question that will naturally be suggested by the foregoing remarks. How is the chemist to satisfy all the demands made upon him at once by his customers, by the law, and by regard for the character of his occupation? When it is considered that most of the preparations of the kind now referred to are proprietary articles, in the sale of which the retailer has really no responsibility beyond that of supplying them to his customers intact as they come from the makers, it seems a somewhat unreasonable thing that the retailer should be held accountable for a want of conformity with the provisions of the law; at any rate it may be looked upon as pressing harshly upon him that this is the case in regard to an article of which he knows nothing more than that it is called "wine." We would therefore suggest as a means of removing this difficulty in the sale of "medicated wines," that the proprietary makers of these preparations should bear the onus of meeting the requirements of the Excise authorities. The object of the authorities is to protect the revenue from loss, and as they consider that some loss would result from the sale of "medicated wines" without a retailer's licence, such possible loss might be prevented by imposing upon the makers of such wines the obligation to attach to each bottle an *ad valorem* stamp that would be equivalent to the licence duty. The responsibility for conforming with the law would then fall upon the proper persons, and the retail sale of the preparations in question would be freed from the possibility of inconvenience to the sellers. But for such an arrangement of the matter fresh legislation would be required, and though we have reason to believe it would not meet with opposition from the excise authorities it might not be so favourably regarded in other quarters. The subject, however, is one that deserves consideration, as the only alternative to taking out a licence if the sale of "medicated wines" is to be continued by chemists.

An Evening Meeting of the Pharmaceutical Society will be held at 17, Bloomsbury Square, London, on Wednesday next, at eight o'clock, when papers will be read entitled "A Method for the Estimation of Nitrites," by Professor Dunstan and Mr. T. S. Dymond, and "Notes on Egyptian Opium and Some Other Drugs of the Cairo Bazaar," by Mr. W. Martindale.

* * *

An Evening Meeting of the Society will also be held on Wednesday, at half-past eight o'clock, at 36, York Place, Edinburgh, when there will be read a paper entitled, "Compound Liquorice Powder; Suggested Improvement," by Mr. J. H. Fisher; and a "Note on Suspension of Bismuth Salts in Mixtures," by Mr. S. Lawrence. There will also be a communication read from Mr. T. Maben.

* * *

On Wednesday morning next, at half-past eleven, a meeting will be held to make preliminary arrangements for the Annual Dinner of the members of the Pharmaceutical Society and their friends in May next. It is proposed that, as last year, the price of the dinner ticket should be limited to one guinea, and that the extra expenses of music, entertainment by guests, etc., should be defrayed by subscriptions from stewards. It is therefore requested that gentlemen who are willing to act as stewards, but who will not be able to be present at the meeting on Wednesday next, should communicate their willingness at once, to the President, Mr. M. Carteighe, 17, Bloomsbury Square.

* * *

The Pharmacy Acts Amendment Bill was introduced into the House of Commons and read a first time on Friday, the 1st inst., the Bill bearing the names of Sir Henry Roscoe, Dr. Farquharson, Sir Tindal Robertson, Mr. Craig, Sir Trevor Lawrence, and Sir Guyer Hunter. The second reading is set down for Wednesday, the 8th of May.

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We understand that Mr. John J. Sapp, Chemist and Druggist, and a Member of the Pharmaceutical Society, has been appointed a Magistrate for the Borough of Portsmouth.

* * *

Two prosecutions for the sale of adulterated olive oil recently tried in the Glasgow Sheriff Court have resulted in convictions in both instances. The oil was sold in bottles labelled "Warranted pure," but was found to contain in one case ten per cent. sesame oil, and in the other as much as forty per cent. of admixture. It appears that this adulterated oil is put up in bottles in Italy, and the defence offered was that the oil was sold as imported. The magistrate, however, held that the sale of such oil as olive oil was an infraction of the Food and Drugs Act, and found the accused guilty, ordering each of them to pay a fine of two pounds. In both these cases the vendors were grocers, but the frequency of the practice of adulterating olive oil is so great that there is need of caution being exercised by chemists as to the quality of this article.

* * *

The annual dinner of the Liverpool Chemists Association is arranged to take place on Thursday, March 14, at the Royal Restaurant, Old Hale Street. Tickets, 5s. each, may be had of the Honorary Secretary, Mr. J. Bain, 122, Robson Street.

* * *

The next meeting of the School of Pharmacy Students' Association will be held on Thursday, March 14, when Mr. T. Woodruff will read a paper on the "Preparation of Aloin," and Mr. Hawkins will give a "Report on Inorganic Chemistry."

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, March 6, 1889.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Messrs. Allen, Atkins, Butt, Cross, Evans, Gostling, Greenish, Hampson, Hills, Martin, Newsholme, Nichol, Richardson, Robbins, Savage, Southall, Symes and Watt.

The minutes of the last meeting were read and confirmed.

Pharmacy Acts Amendment Bill.

The President announced that the Pharmacy Acts Amendment Bill had been introduced into the House of Commons on the 1st inst., and was backed by the names of Sir Henry Roscoe, Dr. Farquharson, Sir Tindal Robertson, Mr. Craig, Sir Trevor Lawrence and Sir Guyer Hunter.

Mr. Symes said there was a slight error in the printed report of the last Council meeting, inasmuch as it appeared that the resolution authorizing the Law and Parliamentary Committee to introduce the Bill had been carried unanimously. The fact was that several members did not vote in favour of that resolution, though they did not vote against it.

The Late Mr. John Williams.

The President said he had to announce to the members of Council with deep regret that their late friend and past President, Mr. John Williams, had died on the previous Sunday; and as many no doubt would desire to attend the funeral, he might mention that it would take place on Friday at Highgate Cemetery at one o'clock. It would naturally be expected on such an occasion that he should move a resolution of regret at the comparatively early decease of Mr. Williams and of sympathy with his relatives. It was now nearly two years since Mr. Williams had retired from the Council, and barely a year since he had presented the portrait which hung on their walls; and both at the time of his retirement and when the portrait was presented he (the President) had taken the opportunity of referring to the services rendered to the Society by Mr. Williams, and to the efficient work he had done for pharmacy generally. It would not therefore be necessary for him now to again go into much detail with regard to what Mr. Williams had done. Mr. Williams was one of the Society's first pupils, and had been one of the most recent Presidents; and during the whole of the time since he entered pharmacy, until a few weeks before his decease, he continued to take an active interest in all the affairs appertaining to the Society, to pharmacy and to chemistry. Mr. Williams was a man of many sides, and was known not only to pharmacists and wholesale druggists, but he was largely known and respected by men of science all over the country, as well as abroad. Mr. Williams's knowledge of current matters—not political—but of various branches of science in geology, entomology, numismatics and physical science was astonishingly complete, and those who had not enjoyed his personal friendship, or had not had the privilege of accompanying him on some of the long walks which he was so fond of taking, would scarcely give him credit for the amount of knowledge which he possessed. Above all he had the heartiest spirit of good fellowship for every one with whom he came in contact, and he was most generous both in private and in public. It would perhaps be better for him to say no more, for if he were to go into the personal aspect of the question, and recall the many occasions on which he had enjoyed the society of Mr. Williams, both at home and in the Alps, the recollections would be too much for him. They all knew that for the last twenty years Mr. Williams's health had been far from good, but notwithstanding that, both as President and Treasurer of the Society, he had been indefatigable in performing his duties. He would move—

> "That this Council desires to express to the relatives of the late Mr. John Williams the most sincere sympathy at the loss which they have sustained by his lamented decease, and at the same time to record the high esteem in which that gentleman was held by the Council for the valuable services he rendered to pharmacy during the seventeen years he was a member of the Council, and especially for the efficient manner in which he performed his duties as Treasurer and President of the Society."

The Vice-President in seconding the motion said he did not desire to add anything to the remarks which the President had made with reference to the loss the Society had sustained. He would only say that personally he deeply regretted Mr. Williams as a very sincere friend, and one with whom it had been his privilege to spend some very enjoyable hours, and always to his advantage, for he was never in Mr. Williams's company without leaving it a wiser and, he hoped, a better man.

Mr. Watt wished to say, on behalf of the members of the Society in Scotland, that he was sure the news of Mr. Williams's death would be received there with the greatest regret and sympathy. He should never forget the kindness of Mr. Williams to those who came up from Scotland as a deputation to the Society some years ago, and he was quite certain that his memory would long be cherished with affection in Scotland.

Mr. Greenish said he had known Mr. Williams for quite thirty years, and he could only say how deeply he appreciated his friendship. At that Council he had always looked upon Mr. Williams as a most valuable member, who always had the best interests of the Society at heart, and also the interests of the whole body of chemists and druggists. As a scientific man Mr. Williams was much appreciated, and as the President had remarked, he was widely known beyond the ranks of pharmacy. These few words very inadequately represented his feelings on the occasion.

Mr. Savage said he could not add anything to what had been said, but still he felt that he could not withhold just a word or two. He had the privilege of working with Mr. Williams when he was President, and a kinder or more genial friend he had never met. It was with deep regret that he had heard of his death, though not altogether unprepared for it, knowing how long he had been in failing health. There was no doubt that sometimes Mr. Williams had had to suffer considerable pain, but notwithstanding that he went through his duties with such precision and care that it was always a pleasure to act with him.

The motion was then put and carried unanimously.

Diplomas.

The undermentioned, being duly registered as Pharmaceutical Chemists, were respectively granted a diploma stamped with the seal of the Society:—

Andrew, Charles William.
Baxter, George Munnerley.
Dyson, Archibald.
Humphreys, Henry.
Phillips, Wilfred Charles.
Taylor, Edward.

Elections.

MEMBERS.

Pharmaceutical Chemists.

The following having passed the Major examination, and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Andrew, Charles William .....Richmond (Surrey).
Dyson, Archibald .....Ealing.
Fowler, William Henry .....Weybridge.
Howell, Alfred.....London.
Jennings, Richard Tildesley...Hyères (Var) France.
Taylor, Edward .....Leytonstone.

Chemist and Druggist.

Thomas George Stoddart, of Melbourne, Victoria, who was registered as being in business on his own account before August 1, 1868, having tendered his subscription for the current year, was elected a "Member" of the Society.

ASSOCIATES IN BUSINESS.

The following having passed the Minor examination, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Abbott, Herbert Edwd. Tripp...Lowestoft.
Bailey, Herbert Henry .....Portsmouth.
Bailey, John Harvey .....Plymouth.
Briggs, Thomas .....Ripponden.
Charlesworth, Moorhouse .....Idle.
Davidson, Joshua.....Blackburn.
Eynon, Charles James .....West Bromwich.
Knighton, Thomas William ...Staveley.
Scholes, William Isaac .....Eccles.

ASSOCIATES.

The following having passed the Minor examination, and tendered (or paid as "Apprentices or Students") their subscriptions for the current year, were elected "Associates" of the Society:—

Chantry, John Henry.....Horncastle.
Dee, Arthur Henry .....Tewkesbury.
Flint, Charles .....Stratford-on-Avon.
Flint, Francis Bramwell .....Leek.
Foster, Murray Toogood.....Collumpton.
Haigh, Walter .....Halifax.
Heath, Jonathan Lucas .....Shrewsbury.
Horry, William Tom .....Boston.
Howden, Frederick Clair .....London.
Hughes, Philip Henry Alban...Liverpool.
Jones, Thomas John .....Holyhead.
Latchmore, Alfred ....Plymouth.
Ling, Frederic George .....Southampton.
Matthews, Edwin James .....Cowbridge.
Powell, Samuel Rider.....Scarborough.
Robertson, William George ...Jedburgh.
Sayers, William Charles.....London.
Scott, Walter Carey .....Northampton.
Shaw, William Alfred .....Sheffield
Stainer, John Ward .....Folkestone.
Tabor, Thomas Slade .....London.
Timmins, Albert .....Kidderminster.
Vincent, Robert .....Nottingham.
Wain, Clement John .....Hanley.
Walters, Edwin .....Ashton-under-Lyne.
Wells, William.....Islington.

APPRENTICES OR STUDENTS.

The following having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Briant, Harold James .....London.
Denny, John Harvey .....Woodbridge.
Feather, Arad .....Pontefract.
Francis, Henry.....Croydon.
Gilmour, William, junr.....Edinburgh.
Goodwin, George Ebenezer ...London.
Jeffery, Arthur Harold Ernest..Bridgnorth.
Jones, Frederick Pryce .....Newtown.
Judd, Walter Rossell .....Liverpool.
Kitson, Edward John, junr. ...Worcester.
Moore, John .....Stafford.
Pensotti, Charles Bernard.....Kidderminster.
Poll, George John .....Wells (Norfolk).
Pritchard, Robert John .....Old Swindon.
Rees, David Charles .....Ipswich.
Ridley, Alexander ....Ipswich.
Rive, Percy .....Jersey.
Robertson, Alexander.....Elgin.
Rogers, Joseph Edward Gilbert.London.
Rugg, Walter James .....London.
Smith, John James.....Otley.
Smith, Stanley.....Truro.
Thomas, John Abraham.....Cardiff.
Thornley, John Brooks .....London.
Upsall, Edgar Arthur.....Holbeach.
Wyper, William .....Hamilton.

Several persons were restored to their former position in the Society upon payment respectively of the current year's subscription and a fine.

Restorations to the Register.

The names of the following persons, who have severally made the required declarations and paid a fine of one guinea, were restored to the Register of Chemists and Druggists:—

William Hanbury, 37, High Street, Belfast,
Frederick John Miles, Athenæum Lane, King's Lynn.

Reports of Committees.

FINANCE.

The report of this Committee was read, including a recommendation that sundry accounts be paid.

The President moved the adoption of the report and recommendations, which he said contained nothing requiring special remark.

The motion was agreed to.

Mr. Hampson having asked a question as to the assessment of the Society's premises,

The President said the attention of the Finance Committee had been called to this subject when the assessment was made, and on an appeal a slight reduction had been obtained.

The Secretary stated that the assessment on the new building was £267.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grant:—

£10 to the widow (aged 30) of a member, with two young children dependent on her. Applicant had had a grant of like amount in April, 1887. (Dublin.)

Two cases had been deferred for further information, and two others the Committee had declined to entertain.

Death of an Annuitant.

The Secretary had reported the death, on March 4, of Lydia S. Pownall, who had been an annuitant since Christmas, 1887.

The Vice-President moved the adoption of the report and recommendations, which was unanimously agreed to.

In committee some further explanation was given as to the circumstances attending the death of the annuitant.

LIBRARY, MUSEUM, LABORATORY AND HOUSE.

Library.

The report of the Librarian had been received, including the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
January	Day . .	563	30	5	21
	Evening .	263	21	6	12

Circulation of books.	Town.	Country.	Total.	Carriage.
January . . .	186	144	330	£1 18 1

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

For the Library in London—

California Pharmaceutical Society and College of Pharmacy, Proceedings, 1887–88.

From the SOCIETY.

Klein (A.), Studien über den gerichtlich-chemischen Nachweis von Blut, 1889.

From Professor DRAGENDORFF.

For the Library in Edinburgh—

Year-Book of Pharmacy, 1888.

From the BRITISH PHARMACEUTICAL CONFERENCE.

The Committee recommended the purchase of the undermentioned works:—

For the Library in London—

The Art of Dispensing, 3rd edition.

Royal Society Catalogue of Scientific Papers, 1874-83.

For the Library in Edinburgh—

Aberdeen Royal Infirmary Pharmacopœia.

Museum.

The Curator's report had been received, and included the following particulars:—

Attendance.	Total.	Highest.	Lowest.	Average.
Morning	606	42	11	21
Evening	120	10	1	5

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Specimens of 26 varieties of New Zealand seeds.

From Mr. T. H. HILLS, London.

Specimen of Mogador Gum.

From Messrs. SYMES and HALLAWELL, Liverpool.

Microscopic slides of the bark of *Cascara sagrada*.

From Mr. J. HART, Manchester.

Specimen of Massoi bark and of the fruits of *Tetranthera citrata*.

From Messrs. SCHIMMEL and Co.

The Staff of the Society's School had attended, and reported on their respective classes.

Estimates for the supply of paper for the Journal had been submitted, and that of Messrs. Saunders and Sons was recommended for acceptance.

Divisional Secretaries for London.

The Committee had selected the names of certain gentlemen, one in each parliamentary division of London, whom it was recommended should be appointed Divisional Secretaries, and at a subsequent meeting, the consent of these gentlemen to act having been obtained, the Council was recommended to appoint them.

It was also recommended that a fume cupboard be fixed in the gallery of the Lecture Theatre.

The PRESIDENT moved that the report be received and adopted. He said the sum of money to be expended in the erection of the fume chamber was not a serious matter, as there was a chimney shaft running close to the gallery. The immediate object was to give facilities for performing some biological experiments which Professor Green wished to conduct, in which nasty smelling gases were required, but it would also be useful for other chemical purposes. With regard to the divisional secretaries, the Committee had spent much time in considering the list, and with the assistance of the Secretary and Mr. Allen had been able to secure the services of fifty-eight gentlemen—one for each of the divisions—whose appointment he should submit presently in a separate resolution.

The motion was seconded by Mr. WATT and carried unanimously.

The PRESIDENT then moved that the gentlemen nominated should be appointed divisional secretaries of the Society in their respective parliamentary divisions of London. The list will be found on p. 730.

Mr. HILLS said he was very glad the movement had been so far successful. He thought a large amount of the success was due to the personal efforts made by Mr. Allen and the Secretary, who had devoted a large amount of time and energy to the work.

Mr. ATKINS said Mr. Allen had given four days of his valuable time to this work, for which the Council was greatly indebted to him. He ventured to think the indirect result in exciting greater interest on the part of these gentlemen in the work of the Society would be very beneficial. He would ask whether the whole of London was included.

The PRESIDENT said there were parts of the counties of Middlesex, Surrey, and Essex which abutted on London not included in the list, but it was hoped that eventually some persons might be secured to represent the Society in those districts.

Mr. HAMPSON was very gratified that these lists had been completed by the exertions of Mr. Allen and the Secretary. It was quite a new departure, and he was sure that it must in the long run be extremely beneficial. No doubt these gentlemen would for a time find some difficulty in knowing what they were to do; but the very fact that they were publicly identified with the work of the Society was in itself important, and he was sure that their exertions with regard to the Benevolent Fund would be felt at once. Further, when it was necessary to call upon them for work in other directions, either to support or to oppose Bills introduced into Parliament, their influence would be extremely important. Probably in the future they would have more to do when the unfortunate depression and gloom of the present time had been removed, and perhaps their exertions would be useful in helping to remove it. At any rate he felt extremely glad that the appointments were about to be made.

Mr. ALLEN said he was very pleased to find that the little work he had been able to do in this direction had been approved of, but he certainly disclaimed having done anything remarkable. In calling on these gentlemen in conjunction with the Secretary he had very little to do or to say, for in almost every instance the consent of these gentlemen to act was obtained without any pressure. When the Secretary first asked him to accompany him in calling upon them he was a little dubious about it, but he thought possibly he should not be exceeding his function as a member of the Council, and that it might be better for two to call rather than one, and he, therefore, agreed. They were treated very kindly all through, and it was very satisfactory to find in the most remote parts of London, so far down as Poplar on the one side and Wandsworth on the other, that there were numbers of men still loyal to the Society, and still believing that there was a great work for it in future to do. There were now fifty-eight men who had given in their adhesion to this new office. What it might come to they could not tell; they might be an element of great power, but in nearly every case, with the exception of one or two which were in rather ill-health at present, they had agreed to come to the Society's House to a meeting, and he hoped before long there would be a conference held, at which the plan for their future work might be sketched out.

The PRESIDENT, in putting the motion, said he desired to add his testimony to the value of personal

DIVISIONAL SECRETARIES FOR LONDON.

CITY		H. A. THOMAS, 78, Gracechurch Street, E.C.
BETHNAL GREEN	*North East* ...	W. HARVEY, 85, Approach Road, Victoria Park, E.
	South West ...	A. P. BARNARD, 88, Columbia Road, E.
CHELSEA		E. L. HICKEY, 199, King's Road, Chelsea, S.W.
FINSBURY ...	*Holborn*	C. E. TURNER, 20, Bury Street, W.C.
	Central	GEO. PATTISON, 139, St. John Street Road, E.C.
	East	CHAS. TROKE, 82, City Road, E.C.
FULHAM		T. O. SANDELL, 2, Keane Terrace, West Kensington, S.W.
HACKNEY ...	*North*	W. SADLER, 257, Evering Road, Upper Clapton, N.E.
	Central	RALPH HALL, 552, Kingsland Road, N.E.
	South	R. O. FITCH, 255, Well Street, South Hackney, N.E.
HAMMERSMITH		E. CULLINAN, 2, Mall Road, Bridge Avenue, Hammersmith, W.
HAMPSTEAD		E. B. STAMP, 29, High Street, Hampstead, N.W.
ISLINGTON ...	*North*	J. MORRIS BROAD, 510, Hornsey Road, N.
	West	JOHN HOLDING, 169, Hemingford Road, Barnsbury, N.
	East	T. HOWARD HALL, 80, Drayton Park, N.
	South	J. T. W. WALLIS, 78, Essex Road, N.
KENSINGTON ...	*North*	HY. LONG, 48, High Street, Notting Hill, W.
	South	J. T. TUPHOLME, 1, Coleherne Terrace, Earls Court, S.W.
MARYLEBONE ...	*East*	WM. MARTINDALE, 10, New Cavendish Street, W.
	West	J. C. HYSLOP, 39, Church Street, Marylebone, N.W.
PADDINGTON ...	*North*	R. H. PARKER, 35, Clifton Road, Maida Vale, W.
	South	F. ANDREWS, 34, Leinster Terrace, Hyde Park, W.
ST. GEORGE'S, HANOVER SQUARE ...		W. GULLIVER, 6, Lower Belgrave Street, S.W.
ST. PANCRAS ...	*North*	G. F. BINDLOSS, 97, Leighton Road, Kentish Town, N.W.
	East	JAMES CORNELIUS, 73, Camden Road, N.W.
	West	J. W. T. MORRISON, 2, Osnaburgh Street, N.W.
	South	FELIX STEVENS, 123, Judd Street, W.C.
SHOREDITCH ...	*Hoxton*	T. W. H. HODSOLL, 11, Sturt Street, Shepherdess Walk, N.
	Haggerston ..	C. WHEELER, 143, Hackney Road, N.E.
STRAND		W. WARREN, 24, Russell Street, Covent Garden, W.C.
TOWER HAMLETS	*Whitechapel* ...	A. O. MUNDY, 11, Norton Folgate, E.
	St. George's ...	CHAS. WALKER, 8, Cannon Street Road, E.
	Limehouse ...	G. B. HATFIELD, 817, Commercial Road, E.
	Mile End	J. H. GRADIDGE, 393, Mile End Road, E.
	Stepney	JAMES ELLARD, 195, Commercial Road, E.
	Bromley and Bow	W. E. HADEN, 224, Roman Road, E.
	Poplar	S. KIRK, 6, Chrisp Street, Poplar, E.
WESTMINSTER		H. N. B. SPINK, Marsham Street, Westminster, S.W.
BATTERSEA		C. M. LUXMOORE, 529, Battersea Park Road, S.W.
CLAPHAM		W. P. ROBINSON, 17, Pavement, Clapham Common, S.W.
CAMBERWELL ...	*North*	A. PELLEW, 374, Old Kent Road, S.E.
	Peckham	M. HOWELL, 61, High Street, Peckham, S. E.
	Dulwich	F. T. SILVERS, 25, Camberwell Green, S.E.
LAMBETH ...	*North*	T. E. SCHOLEY, 51, Lambeth Walk, S.E.
	Kennington ...	H. BATE, 125, South Lambeth Road, S.W.
	Brixton	F. BASCOMBE, 3, Grand Promenade, Brixton, S.W.
	Norwood	T. H. POWELL, 116, Denmark Hill, S.E.
NEWINGTON ...	*West*	W. F. SMITH, 280, Walworth Road, S.E.
	Walworth	JNO. BUTTERWORTH, 21, Walworth Road, S.E.
SOUTHWARK ..	*West*	C. UMNEY, 50, Southwark Street, S.E.
	Rotherhithe ...	H. WIGGINS, 236, Southwark Park Road, S.E.
	Bermondsey ...	H. F. AUSTIN, 126, Bermondsey Street, S.E.
WANDSWORTH		G. NIND, 6, Ringford Road, Wandsworth. S.W.
DEPTFORD		GEO. BALLS, 189, High Street, Deptford, S.E.
LEWISHAM		W. P. WANT, 19, Thornford Road, Lewisham, S.E.
GREENWICH		A. J. BROWN, 55, Trafalgar Road, Greenwich, S.E.
WOOLWICH		JNO. CARTER, 4, Melville Terrace, Woolwich.

influence in all these cases, which had been well illustrated on the present occasion.

The motion was carried unanimously.

BUILDING COMMITTEE.

The PRESIDENT moved that the reports and recommendations of this Committee, which were read at the last Council meeting, be adopted. It was not necessary to say much, as he had already dealt with the matter to some extent. He would simply say, therefore, that the building of No. 15, Bloomsbury Square, would be in the nature of a change of investment. It was proposed to take the stock invested in 2¾ Per Cents. and practically invest it in that house, and there ought to be no loss in the annual income after allowing for the ground rent. The actual charge on the Society would be that involved in the construction of No. 16, and it was important, apart from any question of the use to which the rooms were put, that there should be an approach to the examination hall from Bloomsbury Square on the ground floor, and it was proposed that the offices should be on the ground floor and a Council Room on the first floor of the building. That would give ample accommodation, and would involve an annual charge which the Committee, having considered the finances, thought might be incurred. Of course, the question as to what the annual income of the Society was likely to be in seven or ten years' time was to some extent a matter of conjecture, but the members of the Committee were very well acquainted with the financial history of the Society, and they all recommended this as being practically the best thing to be done. There were certain charges which would probably cease some day, which he could not refer to very well in public, and there were certain other sources of income which had been carefully considered. Even assuming it to be doubtful whether the Society could at any future time afford to keep up its establishment, and that the very gloomy views which were enunciated from time to time were fulfilled, which he did not think would be the case, for the same views were put forward twenty years ago, it would be a very unwise policy not to make an approach from Bloomsbury Square to the valuable building at the back. It was quite obvious that supposing the house had to be divided, if the Society could no longer continue its operations in the whole building, it would be possible to divide the holding, and in any case the Committee was of opinion that this would be the wisest and best thing to do under the circumstances.

Mr. ATKINS asked when the first ground rents would fall in.

The PRESIDENT said in about twenty-five years. When that investment was made, on the recommendation of the Finance Committee, it was to provide for the possibility of having to construct new premises. Those ground rents did not now yield a very large annual income, because they had only a short term to run, but when they fell in the income produced would be four or five times that received now, and would be equal to £700 or £800 a year.

Mr. RICHARDSON asked the length of the lease of the premises the Society occupied.

The PRESIDENT said about sixty years; the term of the new premises was eighty years.

Mr. ROBBINS seconded the motion. As the President had explained, the question of rebuilding No. 15 was simply a re-investment of capital, which he hoped would then bring in more than it did at present.

Mr. HAMPSON said he presumed before any decision was made with regard to the building the Committee would come again to the Council and submit estimates. The wording of the Report seemed to give the Committee very full powers to carry out the scheme.

The PRESIDENT said it was not intended to do so. Of course the Committee would present another report before contracts were accepted.

Mr. RICHARDSON asked whether it would not be necessary to enlarge the Museum in some other direction, to make up for the addition to the Secretary's house accommodation, and whether it would not have been better to remove the Secretary to the new house.

The PRESIDENT said it was intended to utilise the old examination rooms as an adjunct to the Museum, and the other question was rather one of finance; it might be done eventually, but it was not thought advisable at present.

Mr. EVANS asked what capital the Society had invested.

The PRESIDENT said £13,000 in stocks and between £5000 and £6000 in ground rents.

Mr. EVANS asked if the President could state how much the receipts exceeded the expenditure independent of the buildings.

The PRESIDENT said the relation between the receipts and expenditure varied very much, and it was difficult even to give an average of the last two years, because there were a great many things which had been paid out of the revenue, such as fitting up the practical pharmacy laboratory, buying apparatus, and so forth. There was not likely to be much margin for a few years.

Mr. EVANS said there were a few figures he should like to have before this motion was passed, viz., the amount of capital invested, independent of the present property, and the proportion of expenditure to receipts independent of property altogether. Independent of the building operations he took it that every year there would be something or other exceptional required, and he should like to have an idea what rent was expected for No. 15 when it was built, on what basis it was calculated, and whether it was thought that the increase in the ground rents when they fell in would be more than the increase which would have to be paid for the present property when the lease expired. Those ground rents would expire much sooner than the Society's own lease, but there was a question of leasehold enfranchisement coming forward, and he should like to know what the position of the Society was with regard to the ground rents generally.

The PRESIDENT said he could not say much with reference to any future legislation, but the Committee was satisfied that the increased income from ground rents would enable the Society to acquire a renewed lease of that property for a longer period when required. That lease would not be out for many years after the ground rents fell in, and if the latter were realized the capital sum could be reinvested either in other ground rents or in stock. It was a perfectly fair question for Mr. Evans to raise, but it would be some time before anything of the kind was likely to occur, and it had not been usual for the Legislature to pass any measure which would sacrifice the capital of a benevolent and educational Society like that and others without due consideration. The Committee did not base its valuation of these ground rents on the basis of what would happen at the end of the term, but on the existing rental of the premises, which it happened to know.

Mr. WATT asked if the £13,000 invested in consols, to which the Chairman had referred, did not include the sum representing the Life Members and the Benevolent Fund?

The PRESIDENT said £3000 of that represented the Life Members' Fund. It was about £10,000 without that.

Mr. WATT asked if the Society was compelled to build this property, to which the President replied in the affirmative.

Mr. SYMES asked if the Society was compelled to rebuild, or could it let to someone else. If it were found that the Society was not justified in rebuilding

could it not underlet the property? He quite agreed that better accommodation should be provided for the Secretary, but supposing it were found on investigation that it was really not worth while, for the sake of getting an entrance to the building at the back, to spend the money of the Society, that more good could be done by spending it in some other way—because 17, Bloomsbury Square, was not the Society, it was only the central establishment, and he held that the Society was made up of its members, and that this money should be expended on the Society, not merely on the building,—he took it the Society might let the lease to someone else who was sufficiently enterprising to build two houses, take the Secretary's residence for the purpose of increasing the Society's own accommodation, and find him a house somewhere else. He thought that would be perfectly feasible, and would entail a much smaller expenditure, and involve much less permanent outlay. At any rate he should like to know whether that had been duly considered. He did not want to go back to old unpleasant subjects, but it would be remembered that when it was first decided to embark on this building scheme the whole expenditure was supposed to be about £10,000, with perhaps a margin of £1000. Now the expenditure on the back premises had already amounted to over £10,000, and if the Council was told it was intended to expend £6750 on the new building he should like to know whether it was at all likely that that would increase in the same ratio, which would bring it to be £16,750. If the back building cost two and a half times the original amount calculated, which was £4000, was it not possible the front building would amount to double the estimate.

The PRESIDENT did not think it was possible, in the nature of things. He would also remark that the statements referred to were made haphazard by one member of the Council; it was only a very rough calculation made at the moment, not worked out in any way. It was quite right that these questions should be asked; but the Committee had thoroughly considered the suggestion, and was of opinion that it would be bad finance to send the Secretary elsewhere, because all the rooms which he occupied, except one, were practically such as could not be utilised otherwise. The Secretary was content, and would prefer to remain where he was, and that of course ought to have influence with the Council.

Mr. SYMES said he was quite content with this explanation.

Mr. ATKINS said the carrying out of this work was really almost essential to the completion of that already accomplished, and it would be impossible to hark back to the original position. The premises at the rear would fail largely to accomplish their work unless a proper entrance was provided. As he understood the matter the expenditure on No. 15 would be an investment, and it was No. 16 only which had to be considered as an expenditure, and that would involve roughly an outlay of about £4000, and a decrease in the income of about £200 a year. He did not want to pin the members of the Committee to a definite statement, but he thought that was about the mark. Then of course there would be further charges for the maintenance of the establishment, an increase in the assessment, and the invariable outlay which any building involved in maintenance, insurance, and so on. In what position would the Society then be with regard to the invested property after spending £4000?

The PRESIDENT said there would be £9000 left, and the ground rents £5000.

Mr. EVANS asked if it would not be possible to have an exact account of the expenditure and receipts, to know how much the Society received more than it paid.

The PRESIDENT said he could not give the figures then, and he proposed to ask the Council to accept the report of the Committee which had gone into the matter. It was mainly a question of the estimated future expenditure.

Mr. MARTIN said the matter had been carefully considered in all its bearings by the Committee, and he thought probably the Council would adopt the report without comment. He thought the President had rather understated the property of the Society, taking the figures in the last balance sheet.

The PRESIDENT said £4000 had been sold out since then; but he had not taken any account of the existing premises, although they were worth a good deal of money both in London and in Edinburgh.

Mr. MARTIN asked if the Committee had considered the amount of money that would be necessary to fit up the new premises (No. 16) and re-arrange the old premises for the purposes intended.

The PRESIDENT said this had been done generally, but not in detail. Nearly all the fittings and furniture they had would be available, both for the Secretary's offices and for the Council room. The fitting up of the present Council room for the Library would only require shelves. That expenditure was not referred to at all in the report.

Mr. EVANS thought the members of Council would be all agreed that they had made a mistake in not adopting Mr. Richardson's suggestion some time ago, that they should wait until the whole building scheme could be carried out in one operation, by which plan he thought it was evident that money could have been saved.

The PRESIDENT said there were several ways in which the Society had to work to obtain influence and power, individually and in its corporate capacity, and the names of the gentlemen who were on the back of the Pharmacy Bill would not be there if it were not that they believed that the Society was earnest in its educational desires, and anxious, as far as possible, while asking for extra powers for examinations, to carry them out in a satisfactory and complete manner. He knew nothing which had affected the outside world so much as bringing people to that house to see the premises and what was going on. It all went for something, and the members themselves were always pleased to find that the central house of the Society in London and the premises in Edinburgh were of so desirable a character. Although he might be considered a spendthrift President, he was proud of having induced the Council to buy that house in Edinburgh, which might be sold at any moment for more money than it cost, and the lease of that very house in which the Council was now meeting could be sold at a great advantage at any time. He must ask the Council to take a broad view of these questions. When he first came on the Council he heard of the difficulties which beset it about thirty years ago with regard to that very house in which the Council was now met. Mr. Jacob Bell had such a difficulty in getting the then Council to face the little increased expenditure involved in taking it that he had to go and buy the lease himself, and then ask the Council to take it; but when he had done so the Council was very ready to take it from him, and to fit the building up. Quite apart from ways and means, the leases of these houses were not bad investments. He hoped the Council would trust him and the Committee; they were not children. He had been at work for the Society longer than most of those he saw around him. He knew its history and expenditure. He knew where to look for money if it was wanted, where to get it voluntarily, and where to get it by compulsion, and his colleagues were seven or eight members of the Council who had threshed the subject out, not only in Committee, but had taken pains to go through the financial and other history of the Society before coming to a con-

clusion. He therefore asked the Council to accept the Report without cross-examining him upon little points which he could not answer at the moment.

Mr. SYMES asked if the President meant that the members of the Council were not to be convinced in their own minds on such an important matter as this; that it was really wrong for them to ask questions.

The PRESIDENT replied that what he had said was that he hoped the Council would accept the conclusion of the Committee.

Mr. RICHARDSON thoroughly endorsed every word the President had said, and approved of what was going to be done in making the building more presentable to the general body of the trade. He was sure there was no one belonging to pharmacy in the country who would begrudge the expenditure when they saw that handsome building, which they would look upon as part and parcel of their own property. Many years ago Mr. Williams was one of those who was quite as much a spendthrift as the present President, and he was very anxious that the Society should purchase the Inns of Court Hotel, and he believed he regretted to the last day of his existence that that was not done. This policy was in the right direction. What he said originally was that the Society might have saved a little if this building had been decided upon altogether, but he did not think it could have saved thousands, as Mr. Evans had suggested. As the President had explained it was impossible to take that course, and the Council was obliged to do the work piecemeal, but it was done originally with the intention of dovetailing the front building in afterwards, so that he did not think much additional expense would be incurred.

Mr. GOSTLING entirely endorsed the recommendation of the Committee.

Mr. WATT said he wished to simply utter a word of usual Scotch caution to the effect that he hoped that members of the Committee would endeavour not to exceed the estimate proposed. He had not the figures with him, but he had gone into them rather carefully, and he thought unless great care were taken there would be some difficulty in making the expenditure keep within the income.

The motion was then put and carried *nem. con.*

RESEARCH.

Report of the Research Committee.

The Research Committee was constituted and its duties were defined by the two following resolutions, which were passed by the Council at its meeting in January, 1888:—

1. "That the sum of £300 a year be granted for the next three years to a committee to be appointed annually by the Council, and to consist of the President, the Vice-President, and two other members of Council, with instructions to make such arrangements with the Professor of Chemistry as will enable advanced students and others to undertake pharmaceutical research under his direction, and that of the Committee. The Committee, which shall be called the Research Committee, shall meet monthly, except during the vacation, or oftener if required, and shall report from time to time to the Council. The Committee shall have the power to add to their number three persons, not necessarily members of the Society, as additional members of the Committee."
2. "That the Research Committee be authorized to fit up the two laboratories on the top floor of the new building, the other two rooms on the same floor to be fitted, one as a balance-room and store, and the other as an ordinary writing-room for the use of the Professor and members of the Committee at a cost not exceeding £300.

After this meeting of the Council the Committee at once proceeded to carry into effect these two resolutions. The Professor of Chemistry was asked to commence experimental work in the small laboratory which had formerly been in the occupation of Dr. Redwood, and with this object he was provided with an assistant. On the nomination of the Professor, two advanced students were allowed to commence preliminary work under his direction. The Professor was also requested to prepare plans for the equipment of the four rooms which had been allotted for the purpose in the new building. After the Committee had carefully considered these plans, the equipment was commenced, under the general supervision of the Professor and the Architect, at a cost of £300. This work, and the furnishing of the Laboratory with the necessary apparatus, were not completed until the end of the first week in April. In the meantime Professor Dunstan and Mr. Dymond had finished a portion of the investigation of the chemistry of the nitrites of the paraffin series, and a paper dealing with the preparation and properties of ethyl nitrite was communicated to the Society at the Evening Meeting on April 11, 1888.

The Laboratory was now ready for occupation. Two rooms had been conveniently and economically fitted as laboratories, a third as a balance-room and chemical store, and the fourth as a writing-room and for the reception of delicate apparatus. The Laboratory accommodates about six workers, exclusive of the Director and his Assistant.

The Committee has met the Director once a month to discuss questions connected with the administration and work of the Laboratory.

Acting in accordance with Resolution 1, the Committee has invited and secured the invaluable co-operation as additional members of the Committee, of Professor Michael Foster, F.R.S., Dr. Lauder Brunton, F.R.S., and Mr. Charles Ekin, and subsequently, with the consent of the Council, of Professor Frankland, F.R.S.

The Committee has issued the following "Regulations" relating to the admission of persons as workers in the Laboratory:—

1. Any person who desires to assist in the researches undertaken by the Director or who wishes to pursue an investigation on his own account may be admitted into the Laboratory as a worker by the Committee on the nomination of the Director, to whom written application is to be made for the purpose. A worker who desires to remain engaged in investigation for more than one year shall each year renew his application for admission.

2. Each worker will be expected before his admission to satisfy the Director of his competency, and if he wishes to undertake any particular investigation he must also furnish a statement in writing of its nature and extent.

3. Every worker will be furnished with gas and water, and, at the discretion of the Director, with such materials and apparatus as he may require. He will be expected, on being called upon by the Director, to reinstate any apparatus he may damage.

4. No inquiry having a direct commercial object shall be conducted in the Laboratory.

5. The selection of subjects for investigation shall be left to the discretion of the Committee, assisted by the Director. The Director shall allow the utmost freedom to each investigator in the methods of research, so far as they are consistent with the orderly government of the Laboratory. No publication of any research shall take place without the sanction of the Committee or the Director, and in all cases the words "Communication from the Research Laboratory of the Pharmaceutical Society of Great Britain," or their equivalent, shall be appended to the title of each paper.

6. The Director shall have power (for any sufficient cause) to order a worker to cease to use the Laboratory at any time or immediately, but the worker shall have a right of appeal to the Committee, whose decision shall be final.

During the past year nine persons have been admitted as workers in the Laboratory, and several investigations have been commenced. Up to the present, however, attention has been mainly devoted to a research on the chemistry of some of the nitrites of the paraffin series, which are of great practical importance on account of their existence in two well-known medicinal preparations of the British Pharmacopœia whose inconstant and indefinite nature has long been regarded as unsatisfactory. The greater part of this research, which has been pursued conjointly on the physiological and therapeutical sides by Professor Cash, F.R.S., of Aberdeen, Dr. Lauder Brunton, F.R.S., and Professor Leech, M.D., of Manchester, has been completed, and the results have been communicated to the Society. This investigation possesses an exceptional interest and importance for the chemist and physiologist as well as for the physician and the pharmacist. The following are the titles of papers which have been published during the past year:—

"The Preparation of Ethyl Nitrite," by Professor Dunstan and Mr. T. S. Dymond; "Chemical Observations on Tartar Emetic," by Professor Dunstan and Miss L. E. Boole; Contributions to the Chemistry and Pharmacology of the Nitrites of the Paraffin Series: 1. Introductory, by Professor Dunstan. 2. On Isobutyl Nitrite, by Professor Dunstan and Mr. E. J. Woolley. 3. The Metameric Amyl Nitrites, by Professor Dunstan and Mr. W. L. Williams. 4. The Chemical Constituents of the Amyl Nitrite used in Medicine, by Professor Dunstan and Mr. E. J. Woolley.

On the subject of the last-named investigation the following papers have also been contributed:—"The Comparative Effects of Spirit of Nitrous Ether and Solution of Ethyl Nitrite," by Professor Leech, M.D., and on the "Effect of Amyl Nitrite," by Dr. Lauder Brunton, F.R.S.

The grant of £300 has, during the past year, been appropriated in the following manner:—Payments to the Director and Demonstrator, £210; wages of porter, apparatus and materials, £80; leaving a balance of £10 to be carried over to the working expenses of the present year.

The actual results which have been gained during the past year have convinced the Committee that the Society will be enabled to give, through this Laboratory, a considerable impetus to the advancement of pharmacology in this country. It is also clear that valuable work is being done, from an educational point of view, in training men who are likely to take prominent positions in Pharmacy in advanced experimental work and in the methods of accurate research. Further, the Laboratory will prove to be of great value to those pharmacists and other persons who are anxious to engage in any pharmacological investigation.

At the present time there are six workers in the Laboratory, and investigations are proceeding on similar lines to those which have already been published. Wherever it may seem necessary, the Committee hopes to be able to arrange for the performance elsewhere, of conjoint physiological and therapeutical work, and by this means to do much towards furnishing a scientific basis to medicine and pharmacy.

The Committee wishes to gratefully acknowledge the following contributions which have been made towards the formation of a small collection of books of reference, for the use of workers in the Laboratory:—"Pharmacographia," from Mr. Thomas Hyde Hills. "Proceedings of the Royal Society" and "Journal of the Chemical Society" (several volumes of each), from Samuel Gale. "Pharmacology, Therapeutics and Materia Medica," by T. Lauder Brunton, M.D., D.Sc., F.R.S., from the Author.

February 5th, 1889.

MICHAEL CARTEIGHE, *President.*
ALEXANDER BOTTLE, *Vice-President.*
THOMAS GREENISH, G. F. SCHACHT, } *Members of Council.*
MICHAEL FOSTER, E. FRANKLAND, T. LAUDER BRUNTON, CHARLES EKIN, } *Additional Members of the Committee.*

The PRESIDENT moved that the report be received and entered on the minutes, and he hoped that it would be considered as on the whole satisfactory. The educational advantages to those working in the laboratory were even greater than those who advocated this scheme some years ago anticipated, and on that ground alone he thought the Society was doing good work. But beyond that it was doing what would probably within a few years give it a position with leading medical men and corporations, and bodies with whom the Society wanted to be in contact, much stronger than it had ever held before. Being himself a member of the Committee it was not for him to praise the work which had been done. He simply asked the Council to receive the report, and enter it on the minutes.

Mr. ATKINS asked if the additional members of the Committee were active members.

The PRESIDENT said they were willing to come when wanted. It would be observed that they did not all live in London. He might refer to the signatures appended to the report. The publication of the work done had hitherto been in the *Pharmaceutical Journal*, but it might be necessary perhaps to allow some purely chemical portion to be published primarily before the Chemical or Royal Society in addition. The regulation with regard to all these societies now was that a paper could not be read after it had been published elsewhere, so that the Committee might sometimes be at a disadvantage in getting the work so widely known amongst people who would appreciate a large part of it as could be wished. Probably in the course of next year there might be certain work, all of which would be published in the *Pharmaceutical Journal*, but some of it might possibly be read conjointly by such men as Dr. Lauder Brunton or Professor Michael Foster before the Royal Society. He took it the Council would not consider it derogatory that the work of the Research Laboratory should under such circumstances be placed before the Royal Society. The Committee thought it desirable that the work which was admitted by competent authorities, not pharmaceutical, to be of the highest value should have the widest possible dissemination.

Mr. GREENISH in seconding the motion said he hoped the Council would by-and-by see the great advantage of this Research Laboratory, and would be in a position to offer substantial rewards to those pupils who successfully conducted important investigations.

Mr. BUTT (who was suffering from a sore throat) said he had a good deal to say on this subject, but was physically unable to say it. It was a very meagre report, and it did not appear that one single thing which had been put forward in the programme had been touched.

Mr. SYMES could not agree that the report was a meagre one. He was in favour of research, and though he thought the Society had paid very handsomely for what had been done, he should be sorry to criticize the first year's work. Having committed the Society to this work and voted a sum of money for it, the Council must be prepared for the fact that during the first year some time would be taken in selecting the work to be undertaken in organizing it, and in short, in getting into the groove. For some two or three years the Council had been spending money on

research, in providing apparatus, chemicals, etc., and there had been a little feeling that the work thus done was not of quite so satisfactory a character as could be wished; in other words, it was not strictly pharmaceutical, and the Society was not getting the benefit of the work and to the extent that it should. He was pleased to see the spirit of nitre and nitrite of amyl taken up, as it looked as if pharmacy as distinguished from pure chemistry would be benefited, and he thought some of this was good work which would be useful not only to the Society, but to scientific men generally. He would like to say, however, as the President had expressed a hope that in future the papers would be of a more purely scientific character, such as would be suitable for the Royal Society, that in his view the laboratory should stick more closely to pharmaceutical work. Very little had been done which was strictly pharmaceutical, very little that a member of the Society would as a pharmacist appreciate, or which would benefit him to an extent corresponding with the expenditure incurred. The Society had spent something like £10,500 in putting up a building which also included an examination hall, but which was essentially a Research Laboratory and was originally known by that name, and having expended that money and voted £300 a year in addition for the work to be done there, the question he asked himself was whether there was anything in the work done that was strictly pharmaceutical, which came into his daily or even occasional occupation or gave him a modicum of the benefit which he might expect from contributing to the Society? He should say that for the first year's work there was every excuse for what Mr. Butt called the meagreness of the report, but he was sorry to hear from the President that the Committee was wanting to get off what he thought the right track. If the Society paid for the work the Society ought to have the credit. He did not grudge the Professor or Director any honour which might accrue to his work, but he was not subsidised to do work for some more lofty Society, which should gain him honour—and of course the Society indirectly; but to do work which should benefit science generally and the Pharmaceutical Society in particular. He hoped, as the laboratory was getting on to a subject which had an interest for pharmacists, that it would continue on these lines, and that at the end of another year, when a full year's work had been carried on, it would be found that a deal of useful work had been done, which would benefit the whole of the members. He should certainly vote for the motion.

The PRESIDENT thought he had been a little misunderstood. What happened was this. When distinguished therapeutists joined in an investigation and made experiments on preparations, they did not always like to come there to read a paper. The Committee did not wish them to go elsewhere and not give the Society credit for its share of the work. It did not want simply to prepare pure materials for other people to get all the *kudos* out of, but wanted to be part and parcel of the work. That was really the object. In some cases it might be found that a more complete paper on the pharmacological subject was produced, with the report of the experiments of men like Dr. Cash and others, by its being read at the Royal Society. He did not want to go too much into detail, but he might say that his only object was that the utmost value in credit and in every other way should be obtained for the money voted by the Society.

The motion was carried with one dissentient.

THE ANNUAL MEETING.

It was resolved that the Annual Meeting to receive the report and accounts for the past year, and to elect the Council for the ensuing year, be held on Wednesday, May 15.

It was also resolved that the preparation of the annual report be referred to the Library, Museum, Laboratory, and House Committee.

FINANCE REPORT.

A motion by Mr. EVANS—

> "That a copy of the report and recommendations of the Finance Committee be placed in the hands of each member of the Council on the morning of the day the Council meets,"

stood next on the agenda paper.

The PRESIDENT said he thought this might be accepted without comment; in fact, it was only necessary for him to authorise the office to supply the copies. Probably some members of the Council would not care to have a copy, and they might mention that in the office, which would save trouble.

Mr. EVANS thought, as the motion had appeared upon the paper, it would be better to have it formally passed, which was accordingly done.

EXAMINATION FEES.

Mr. SYMES said he had to repeat a question which he put in December last, with regard to the reduction of the fee for examination in the case of a gentleman who was unable to present himself on account of ill-health. He presumed the President still retained the opinion that it would be illegal to make a reduction.

The PRESIDENT said, Yes. He was very sorry anyone should take umbrage at this matter, but he must tell those who thought they had a grievance that it was necessary to have regulations of this kind, and so far from it being the desire of any officer of the Society to impose fines, it was quite the reverse. On financial grounds, also, he might say that it did not pay the Society for candidates to fail; it would be to the pecuniary advantage of the Society to pass every candidate the first time.

Mr. SYMES said he did not wish to be pugnacious, but he must say he thought the bye-law in question was capable of being read in two ways, and seeing that the bye-laws were in some cases strained, he considered it would be just as well to strain them a little in favour of persons who thought they had a grievance; this would tend to make friends for the Society instead of enemies. In his view the bye-law allowed a discretion.

The PRESIDENT said he had interpreted the bye-law on the authority of the Solicitor, and he could do no more. With regard to sympathy, he must remind Mr. Symes that no one sympathised with the Board of Examiners when it plucked a candidate, especially if he were the son of a member. It was his painful duty to receive a great many letters from parents and guardians about failures; and no matter whether it was the first or second time, or whatever was the cause, it always caused dissatisfaction and sometimes a little friction. These regulations had to be carried out strictly in order to be fair all round.

GENERAL PURPOSES COMMITTEE.

The report of this Committee included the usual letter from the Solicitor stating the progress which had been made with cases placed in his hands. Two persons had paid penalties into court before trial. In some cases there had been a difficulty in obtaining evidence.

Several cases of alleged infringement had been considered by the Committee, and in some cases proceedings were recommended.

A letter had been read from Mr. Woolley, of Manchester, calling attention to certain changes in railway rates for the carriage of medicines by passenger trains, and it was recommended that the railway companies be communicated with on the subject.

The Council went into committee to consider the report.

On resuming, the report and recommendations were received and adopted.

Report of Examinations.

February, 1889.

ENGLAND AND WALES.

	Candidates. Examined.	Passed.	Failed.
Major (20th)	3	2	1
„ (21st)	2	2	0
„ (22nd).	3	2	1
	— 8	— 6	— 2
Minor (20th)	28	12	16
„ (21st)	32	17	15
„ (22nd).	25	10	15
	—85	—39	— 46
	93	45	48

Preliminary Examination.

Four certificates by approved examining bodies were received in lieu of the Society's examination.

The Jubilee Meeting at Aberdeen.

The President reported that a letter had been received from Mr. W. Gilmour, Chairman of the Executive of the North British Branch, saying he had, as representative of the Society, attended the festivities at Aberdeen, a report of which had appeared in the Journal. The Aberdeen Society was fifty years old, and this was really the first Pharmaceutical Jubilee. He had himself received a card of invitation, but was unable to go, and was glad to find the Society had been so well represented.

A letter had been received from the Liverpool Chemists' Association thanking the Society for the gift of the Register, Calendar and Journal.

Honorary Members.

The President reminded the Council that it was usual to select names next month for election in May as honorary members.

Proceedings of Societies in London.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, Feb. 28, Mr. F. Browne, Vice-President, in the chair.

Mr. H. D. Fuge read the following paper:—

Notes on Cascara Sagrada.

BY H. D. FUGE.

So many conflicting statements have arisen concerning the officinal preparations of this drug, that it was thought desirable to make a few experiments with a view to elucidate several of the points raised.

I may say that I purpose dealing now chiefly with the pharmacy of cascara sagrada; anything in the nature of a chemical investigation of the bark I must relegate to a future period.

The characters of the dried bark as described in the British Pharmacopœia are fairly characteristic, and enable it to be readily distinguished from the various substitutes which have of late tended to manifest themselves on the market; but since a recent bark possesses properties which have a tendency to produce vomiting and epigastric pain, it would seem advisable to add to the official directions that the bark should be kept for a definite period before being employed for purposes of pharmacy.

A curious fact may be mentioned in connection with the nomenclature of cascara sagrada and its preparations. The extracts are officially described as extractum cascaræ sagradæ and extractum cascaræ sagradæ liquidum. No mention of the drug occurs, however, in what from popular use might be termed its natural position, *i.e.*, as cascara sagrada (the English and Latin terms being identical), but one has to turn to Rhamni Purshiani Cortex, there to find that the title cascara sagrada is given merely as a synonym; apparently the same element of uncertainty was present in arranging the position of the drug, as appears in the selection of menstrua for its exhaustion.

I. *Extractum Cascaræ Sagradæ.*—This is directed to be prepared by exhausting the bark in No. 40 powder with proof spirit, by a process of maceration and percolation, with subsequent evaporation of the percolate until of a suitable consistence.

The official sanction might well be given to the recovery of the greater part of the spirit by distillation.

Pills made with this extract have the disadvantage of "falling," which can only be remedied, so far as I am aware, by varnishing them.

II. *Extractum Cascaræ Liquidum.*—This is prepared by the repeated boiling of 16 ounces of the bark with distilled water until exhausted; the strained liquor so obtained being evaporated to 12 fluid ounces, 4 fluid ounces of rectified spirit added when cool, and the product filtered and made up to 16 fluid ounces by the addition of distilled water. The process of filtration requires considerable patience even on the small scale.

The solvents ordered in the preparation of these extracts differ, the one being spirituous the other aqueous. As doubts have been expressed as to the efficiency of water in effecting solution of the principles of cascara, I decided to try whether the bark was thoroughly exhausted in the preparation of the official liquid extract.

A weighed quantity of the bark was treated as described in the Pharmacopœia until the last liquor was free from colour and taste; the residual cascara was dried, then macerated and percolated with spirit. Upon evaporating the percolate a considerable amount of extractive matter remained, which upon being tested physiologically was found to possess the characteristic laxative properties of the drug.

With a view of finding a process for completely extracting the bark a number of formulæ were tried; the following has produced the best preparation in my hands:—

Cascara sagrada in No. 40 powder 20 ounces.
Rectified spirit } . . of each a sufficiency.
Distilled water }

Mix together equal quantities of the spirit and water. With this menstruum moisten the bark, pack tightly in a percolator, pour on more of the liquid and allow it to macerate for forty-eight hours; then proceed to percolate, adding more of the menstruum as necessary, until exhaustion is complete; reserve the first fifteen fluid ounces; evaporate the remainder to the consistence of soft extract and dissolve in the reserved portion; finally make up to 20 fluid ounces by the further addition of the diluted spirit.

The chief objections to the employment of cascara sagrada is its unpleasant and intense bitterness. Two methods are employed to get over this difficulty:—

I. The addition of some agent calculated to mask the bitter taste of the liquid extract.

In the Conference Formulary we have two examples of this kind, viz., syrupus cascaræ sagradæ (1 part of liquid extract in 5), and elixir cascaræ sagradæ (2 parts liquid extract in 5); the latter deposits largely on keeping.

A preparation which does not precipitate on dilution, and, in my opinion, is less nauseous than the above, may be made by mixing equal proportions of the liquid extracts of cascara sagrada and liquorice, a few

minims of spirit of chloroform being added to each dose.

III. *Tasteless Extracts.*—The suggestion that an extract of cascara sagrada devoid of bitterness might be prepared by the indirect agency of magnesia was due to Grazer of San Francisco (*vide Pharm. Journ.*, vol. xv., p. 745).

(1) An extract prepared as directed by him was found to possess very little medicinal value.

(2) An extract prepared by adding magnesia to the powdered bark and proceeding as in the official liquid extract likewise gave very poor results.

(3) The modified formula as given by Mr. Wright at the meeting of the Conference was next tried. This, I consider, yields a much better preparation both pharmaceutically and medicinally; doses about twice as large as are indicated in the case of the official liquid extract should be employed.

(4) An equally good preparation may be made in a less complicated manner by adding magnesia to a spirituous percolate of the bark, the excess being subsequently filtered out before evaporation is completed.

As a result of a number of physiological experiments, made with "tasteless extracts," prepared in accordance with most of the published formulæ, the following conclusion has been arrived at: "That although they possess some degree of medicinal activity, they in no case possess the full physiological value of the ordinary liquid extracts."

The precise nature of the action of the magnesia I have as yet been unable to ascertain. Upon evaporating a portion of the extract to dryness and incinerating, a considerable amount of magnesium oxide was left behind; from this it might be expected that the bitterness would be again developed on acidifying the extract. This, however, is not the case; nor does the residual magnesia separated during the preparation of a tasteless extract as above described become bitter on treating with a slight excess of dilute acid.

It is stated in the important paper on cascara sagrada by Meier and Webber (*Pharm. Journ.*, 1888, page 804), that the resins contained in the bark are not bitter; the fact that the resinous matter precipitated by the addition of acid to a tasteless extract is not bitter would point to this conclusion.

I have not, however, succeeded in obtaining a product free from bitterness by repeated precipitation of the resin from a strong alcoholic solution with water.

A discussion followed in which the Chairman, Messrs. Ince, Holmes, Salter, Taylor, Thornley, Ough, Woodruff and Burridge joined.

Miss M. E. Buchanan then gave a Report on Pharmacology, which included notes on the following subjects: Meconarceine, the presence of morphine in *Eschscholtzia Californica*, strophanthin and ouabain, the constitution of cubebin, coca alkaloids, erythrophleine, eseridine, hyoscyamine and atropine, boldin, Perkin's researches on the constitution of berberine, moussenine, filicic acid, chrysarobin and its substitutes, vanillin, syringin, *Gymnema sylvestre*, *Bacterium purpureum*, the use of blood-pigment as a gauge of gaseous interchange in plants, the comparative value of various antiseptics, and the conclusion arrived at by Schultz that antiseptics which when used in comparatively large quantities put a stop to fermentation, produce an increase in its activity when used sufficiently dilute.

After a discussion on the report, the meeting adjourned.

LONDON CHAMBER OF COMMERCE.

The Spirit Question.

The Annual Meeting of the Chemical Trade Section of the London Chamber of Commerce was held on Tuesday last at Botolph House, Eastcheap.

The Chairman (Mr. Thomas Tyrer), in the course of his address upon the year's work of the Section, after referring in feeling terms to the great loss which the Chamber had sustained by the death of Mr. John Williams, said that the spirit question had occupied a great deal of the time of the Sub-Committee. At the outset he wished to say that the ideas and impressions with regard to the inaccessibility of the authorities at Somerset House, the disposition which had been supposed to exist, viz., that they did not desire to alter their methods, and that they had a sort of prejudice against British interests, were entirely fallacious. Nothing could exceed their courtesy, next, nothing could exceed their willingness to receive knowledge and new light, and their open mindedness to get information, and thirdly, the fact was that British interests were paramount in their minds, a state of things which they might congratulate themselves was at last found to be the normal condition of the authorities of Somerset House. The history of the question was too well known to the members for him to dilate much upon it, but he might be permitted to read a letter which had been received from the Board of Inland Revenue, following upon the steps which the Committee had felt it incumbent to take. It would be recollected that in November the trade papers reported, and many firms had the General Order under which very important concessions were given for the exportation of alcoholic medicinal preparations. By way of comparison he might say that the chief point of concession was this, that the tinctures, or alcoholic medicinal preparations, as he preferred to call them, could be made in the druggist's own premises without let or hindrance. The wholesale druggist had the right to sell methylated spirit, further, he had the right to use methylated spirit in a certain limited number of preparations and operations. The whole tenour and spirit of the Excise regulations was against any person having and using methylated spirit on the same premises, and under the same directions as the use of duty paid spirit, and very properly so. There had been painful instances unfortunately, which they all remembered, and which the Excise could rake up if necessary, where regard for the law had been disregarded, and therefore the preparation of alcoholic tinctures in the same establishments where methylated spirit were used and stored was a concession of the greatest kind, and every wholesale druggist who prepared his own tinctures would see the value of it. Not only was that done, but there was to be no inspection until the druggist had put it into, not 9 gallon casks, according to the old regulation, but into bottles. The bottles instead of being of the capacity of 9 gallon casks could be of the capacity of one pint, and when put into the case notice had merely to be given to the officer of the Inland Revenue, who would take a sample, the case was closed, and after permission had been given it could be removed in the most easy and economical manner. So much were the concessions enlarged that it was the opinion of competent individuals that nothing more was required. When the concessions were put to the test it was thought that they would not undergo the ordeal of preparing these cases under the old conditions, viz., the Order of November last, unless there was some alteration. This showed the attitude and spirit of the authorities, for having given a recent order, one might imagine them saying "We have closed the door, do not bother us any more." On the contrary, they said if it has been found that the regulations do not go far enough, let us see where they can be extended. Upon that further suggestions were made with the view of making the scheme work as easily as possible, and he had the greatest pleasure in saying officially that every one of the suggestions which had been made had been adopted. He had received a letter dated the 27th of February from the Board of Inland Revenue to the

effect that they intended, with as little delay as possible, to make several important changes, and to extend the list of articles in the General Order of the 26th of November, and they trusted that the alterations would give satisfaction to the London Chamber of Commerce, and facilitate the export business of the trade. Although the direct order had not yet been received from the printer, he knew that everything which had been asked for had been granted, so that druggists now were in this position. They could still prepare their tinctures in their own place; the minimum quantity which they could export was now 2 gallons, and that quantity might be put in bottles of so small a size as a gill, and quantities which were multiples of a gill, which would make up when calculated out 2 gallons, would be allowed. Further, there had been an extension of the list in several directions so as to include preparations which were omitted from the British Pharmacopœia. The list had now been made to include the alcoholic medicinal preparations of the British Pharmaceutical Conference, several preparations in the German Pharmacopœia, the Russian Pharmacopœia, Martindale's formulæ, and other unofficial formulæ, and a numerous list of fluid extracts, about which there were two opinions, some persons believing that the amount of spirit, and consequently the drawback, was of so little importance that the amount of business to be done in them was not worth troubling about, whilst others took an entirely different opinion. Now came a point of the gravest importance, and it was this, that the latter list had been divided, and whilst there would be published only one list, a list which was based upon this principle of allowing 10*s.* 4*d.* as compounders, and the allowance of $4\frac{3}{4}$*d.* besides—that any alcoholic medicinal preparations made under the conditions laid down, of the initial strength of proof spirit and rectified spirit, would be permitted to be exported, and have a drawback of 10*s.* 4*d.* That is to say, the authorities, on careful examination of the methods of production, according to the most accessible authorities, concluded that the list did not justify them in giving the waste allowance. He was informed on the highest authority that the list on which the list was made comprised 95 per cent. of the preparations which any druggist was likely to be asked for. If he held a brief for the authorities he did not think he could have proved their case more clearly than that they had met the druggist in the broadest possible spirit. He was sorry that he was not able to submit the draft of the official order, as it had not yet been received from the printer. When the order was received the Sub-Committee would be allowed to criticize it, and to point out whether any further amendments were desired before it practically became the law of the land. The reason of the delay in getting the General Order was owing to the fact that it had been made the subject of discussion between the Customs and the Inland Revenue Department in order that there might be no difference in the general working of the order. On questions relating to spirits the two departments worked in accordance with one another, but in matters of detail there had been a certain amount of liberty of action between them, though the tendency of the time was to alter that, and to do nothing which was not acceptable to both parties. At the present moment a Royal Commission was sitting and inquiring into the question of the amalgamation of the Customs and the Inland Revenue. The members of the Sub-Committee had made various suggestions, and as a rule they had discussed in an open and generous manner matters affecting their own business. There had been a conspicuous absence of jealousy, which he thought was a rather unusual thing. Mr. Umney had placed the resources of his extensive knowledge at the disposal of the Committee, and his laboratory at the services of the Inland Revenue, in order that the matters might be thoroughly threshed out, and the experiments there made had led them to the position they occupied that day. Various other firms had also rendered valuable assistance. The authorities had not taken their word for granted; they satisfied themselves before coming to a conclusion as to what they were doing. If anyone imagined that their benevolent friend, Dr. Bell, did not know where he was, all he could say was, let them try to take him in, and they would very soon find out their mistake. Dr. Bell was animated by a desire to be perfectly fair and just, and having once come to a conclusion druggists would have a great difficulty in upsetting his determination. If the authorities once got it into their heads that traders were acting dishonestly it would be a most disastrous thing for the whole trade, and he hoped that they would on their part act in the spirit in which they had been met. The more widely his remarks on this point were known the better for all. As the authorities had given no reasonable cause to traders to evade the law, they might, without in the slightest degree being revengeful, be remorseless in their degrees of punishment. Mr. R. H. Davis, of Apothecaries' Hall, had also given most valuable assistance in the matter. The moment he received the General Order he would see that it was at once posted to the members of the Committee, with a request that they should show it to their friends in order that it might be thoroughly discussed. In dealing with the subject of the Merchandise Marks Act, he said he was by no means convinced that this was a blessing to the chemical trade, and he thought it would soon become necessary to mitigate the severity of the inspecting clause of the Act. The great mistake made was the suspicion of fraud on the part of everybody. Dealing with the question of railway rates, and the classification of goods as affecting druggists, which he thought was at present most absurd, he mentioned that a special meeting would be held on Tuesday next at 2 o'clock, when he hoped a large number of the trade would be present to discuss that subject.

A resolution renewing one-third of the Committee of the Section having been passed,

Mr. Blagdon proposed that Mr. Thomas Tyrer be re-elected Chairman for the year 1889–90.

Mr. Umney seconded the motion, which was carried unanimously.

Mr. Blagdon having been re-elected Vice-Chairman for the ensuing year, the meeting terminated with a vote of thanks to the Chairman for presiding.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The second general meeting of the fortieth session was held at the Royal Institution on Thursday evening, February 28. The President, Mr. A. H. Samuel, F.C.S., in the chair.

The minutes of the previous meeting were read and confirmed, and the following donations announced:—*The Pharmaceutical Journal*, from the Society; *Canadian Pharmaceutical Journal*, from the publishers; *Pharmaceutical Record of New York*, from the publishers.

The President said he had seen it announced that the Council of the Midland Counties Chemists' Association had unanimously resolved that whilst heartily approving of the action of the Pharmaceutical Council with regard to the enforcement of the curriculum, it was, however, of opinion that additional regulations for the sale of poisons and other matters affecting the safety of the public should be dealt with at the same time, and he thought that it would be well for this Association to

pass a resolution upon the subject, and forward the same to the Council of the Pharmaceutical Society. He therefore invited a discussion, whereupon—

Mr. J. S. Ward moved:—"That it is unadvisable for the Council of the Pharmaceutical Society to proceed to Parliament with the Curriculum Bill only." Mr. Ward argued that there were many questions that affected the trade far more than the curriculum, and he further contended that the curriculum in its present form, if enforced, would prove injurious to the trade and to the Pharmaceutical Society, rather than beneficial to them.

Mr. B. Dickens seconded the motion, but no one continued the discussion, and upon the suggestion of Mr. T. F. Abraham, with the permission of Mr. Dickens, Mr. Ward withdrew it.

The President next called upon Dr. Symes to read his paper on "Gelatine Pill Coating."

The paper, which was published in last week's issue (p. 717), gave rise to an interesting discussion, in which Messrs. M. Conroy, J. Bain, A. C. Abraham and others took part.

Mr. Conroy, in proposing a vote of thanks to Dr. Symes, said in his experience much of the success in coating pills with gelatine depended upon having a solution of gelatine of a strength most suitable to the temperature of the room in which the operation is performed. He had found that a solution that answered well at one temperature was not so successful at another.

Mr. A. C. Abraham, in supporting the vote of thanks, said that Dr. Symes was scarcely correct in his observation that according to the regulations lately issued by the Board of Trade, all pills supplied for ships' use are to be coated with gelatine. This regulation applies only to pills supplied to the North Atlantic steamers.

The vote of thanks having been unanimously accorded to Dr. Symes,

Dr. Symes replied to the points raised in the discussion, and the meeting terminated, the President announcing that the annual dinner will be held on March 14, at the Royal Restaurant.

HAWICK PHARMACEUTICAL ASSOCIATION.

This Association, which has been in a state of suspended animation for the last year or two, has been revived, and the first of the renewed meetings was held on Monday, the 4th of March. There was a good attendance of members, and much interest was shown in the subject, which was the first of a series of demonstrations by Mr. Maben, on "The Volumetric Analysis of the B.P."

The lecture was mainly introductory, and consisted for the most part of definitions of the various terms, a general description of the apparatus and of the various indicators, together with practical illustrations of the various points brought forward.

It is proposed to continue the meetings fortnightly.

LIVERPOOL PHARMACEUTICAL STUDENTS' SOCIETY.

A well attended and representative meeting of assistants and apprentices of chemists and druggists in Liverpool and neighbourhood was held in the drawing-room of the Young Men's Christian Association, Mount Pleasant, on Thursday evening, February 28. The meeting was called by circular, and its object was the formation of a Society bearing the above title. Mr. H. B. Thornton, F.C.S., was elected chairman, and gave an outline of the proposed Society. At the conclusion of his remarks he read a code of rules, according to which it was proposed the Society should work.

After a little debate upon some of the items these rules were adopted.

The following officers were elected to serve during the session:—President, Mr. H. B. Thornton, F.C.S.; Vice-President, Mr. J. F. Fleetcraft; Secretary, Mr. Frank Walker, 69, Salisbury Road, Everton; Treasurer, Mr. B. C. Robinson; Council, Messrs. Barton, Brinson, Emery, Grattan, Lee, Mossop, Riddle, Tozer and Wyatt.

Obituary.

JOHN WILLIAMS, F.I.C., F.C.S.

We regret exceedingly to have to record the death, on Sunday last, of Mr. John Williams, after a short illness, at his residence in Warwick Gardens, S.W. The deceased was a son of Mr. John Williams, formerly Secretary to the Royal Astronomical Society and a prominent member of other learned bodies, and was born in London on the 9th of March, 1824; he had therefore nearly completed his sixty-fifth year. As a youth he entered the service of the late Mr. Thomas Morson, with whom he remained as an assistant until he joined Mr. Hopkin to establish the firm of Hopkin and Williams, with which he remained actively connected until only recently, when after a period of nearly forty years the business passed into other hands. Whilst at the establishment in Southampton Row, Mr. Williams connected himself with the then recently established School of Pharmacy in Bloomsbury Square, in which he was one of the earliest students, and carried off, in 1844, the first prize awarded by the Pharmaceutical Society in Practical Pharmacy. In 1851 Mr. Williams became a Member of the Pharmaceutical Society, but did not take any very prominent part in its proceedings until, in December, 1870, he was elected by the Council to fill the vacancy in that body caused by the retirement of Mr. H. B. Brady. From that time he took a full share of the many duties falling upon a London Member of Council. In 1873 Mr. Williams succeeded Mr. T. H. Hills in the office of Treasurer, and after serving in this office for three years he followed the same gentleman in the Presidential chair, which he occupied for a like period. In June, 1887, fearing that his failing health would prevent him from continuing to perform the duties of a member of Council with his wonted thoroughness he placed his resignation in the hands of his colleagues, and this was shortly afterwards followed by his retirement altogether from active business life. Besides being a practical pharmacist, Mr. Williams was a sound chemist, and as one consequence of this accomplishment the name of his firm became especially associated with the supply of fine chemicals in this country in the days antecedent to the present irruption of continental manufacturers. His zeal as a chemist also found manifestation in numerous published papers, most of which were communicated to the Pharmaceutical Society of Great Britain or the British Pharmaceutical Conference and have been published in this Journal. Of these may be enumerated a "Note on Guaiacol" (1872); "Guaranine" (1872); "Note on the Administration of Phosphorus"

(1874); "Notes on the Preservation of Hydrocyanic Acid" (1874 and 1875); "Note on Salicylate of Methyl" (1875); "Salicylate and Sulphosalicylate of Sodium" (1876); "Note on Some Reactions of the Glycerole of Nitrate of Bismuth" (1876); "Nitrite of Ethyl" (1877); "Note on Salicylic Acid" (1878); "Preliminary Note on Aceto-Nitrate of Iron as a Medicinal Agent" (1878); "Note on Certain Anhydrous Essential Oils" (1884); "Note on the Preparation of Amyl Nitrite" (in conjunction with Mr. H. Smith, 1885); "Crystallized Aconitine" (1886); "Note on the Preservation of Ethyl Nitrite" (1886); "Note on the Testing and Purification of Hydrochlorate of Cocaine" (1887); "New Process for the Preparation of Aconitine" (1887). In addition Mr. Williams proposed a new thermometric scale, based upon the division of the interval between the freezing and the boiling points of mercury into one thousand degrees. In 1883 Mr. Williams was elected President of the British Pharmaceutical Conference, and delivered a most interesting Presidential Address at the meeting at Hastings in the following year. It remains but to say that the funeral is arranged to take place on Friday, the 8th inst., at Highgate Cemetery.

Notice has also been received of the death of the following:—

On Monday, the 4th of March, after a short illness, Mr. Francis Middleton, Pharmaceutical Chemist, of Belsize Road, Hampstead. Mr. Middleton entered the establishment of Messrs. J. Bell and Co., Oxford Street, so far back as 1838, and after a period of forty years, during which time he was much respected and very popular, he left in 1878, and had since been living in retirement. Mr. Middleton was an Associate of the Pharmaceutical Society from 1841 to 1863, from which date to the time of his death he was a Member. He was also a subscriber to the Benevolent Fund from 1865.

On the 25th of December, 1888, Mr. John Loane, Chemist and Druggist, Dock Street, Whitechapel, London. Aged 75 years.

On the 16th of February, 1889, Mr. Frederick William Underdown, Pharmaceutical Chemist, Market Place, Faversham. Aged 50 years. Mr. Underdown had been a Member of the Pharmaceutical Society since 1862.

On the 18th of February, Mr. William Austin Leadbetter, Pharmaceutical Chemist, Melton Mowbray. Aged 65 years. Mr. Leadbetter had been a Member of the Pharmaceutical Society since 1855.

On the 19th of February, Mr. Christopher Francis Buckle, Pharmaceutical Chemist, Gray's Inn Road, London. Aged 77 years. Mr. Buckle had been a Member of the Pharmaceutical Society since 1842.

On the 19th of February, Mr. William Andrew Scott, Chemist and Druggist, Drake Street, Rochdale. Aged 98 years.

On the 21st of February, Mr. Walter Snape, Chemist and Druggist, Addison Road North, Notting Hill, London.

On the 23rd of February, Mr. William Chapman, Chemist and Druggist, Grassington, Yorks. Aged 70 years.

On the 24th of February, Mr. John Henry Stephen, Chemist and Druggist, Chipping Norton. Aged 64 years.

On the 25th of February, Mr. Alfred Faulconbridge, Chemist and Druggist, Lambeth Walk, London. Aged 46 years.

On the 28th of February, Mr. William James Foulkes, Pharmaceutical Chemist, Grange Mount, Birkenhead. Aged 66 years. Mr. Foulkes had been a Member of the Pharmaceutical Society since 1872.

On the 3rd of March, Mr. Andrew Browne, Chemist and Druggist, Runcorn. Aged 64 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Medicine Stamp Act.

Sir,—As an outcome of the meeting of chemists recently held in Newcastle to consider the numerous prosecutions under the Patent Medicine Act, the Committee is desirous of obtaining particulars of proceedings under the same Act in other parts of the country. They would also like to receive information as to labels which have been held liable or not liable by the authorities, but in regard to which the owners are doubtful either way. As hearty and united action is desirable where the interests of all are concerned, it is hoped the trade will respond.

Communications may be addressed to the Chairman, Mr. B. S. Proctor, Grey Street, Newcastle-on-Tyne.

Newcastle-on-Tyne. George Weddell.

The Molybdate Test for Hypophosphites.

Sir,—An Editorial note in the issue of the 23rd ult., mentions that Mr. W. R. Hedges, junr., is unable to obtain the reaction I recently described on treating solutions of hypophosphites with my modification of the ammonic molybdate test.

As this statement unchallenged would tend to throw doubt upon the reliability of the test, I should be glad to be allowed to say that I have tried the reaction upon every hypophosphite obtainable, commercially, including those of some alkaloids, and have never known it to fail when applied exactly as directed. This experience is also entirely confirmed by the students of more than one laboratory who have adopted it as the easiest and most satisfactory test for hypophosphorous acid and the hypophosphites.

Consequently, I am inclined to think that the fault lies in Mr. Hedges not having followed the suggestions, and that instead of employing the ordinary nitric acid solution of ammonic molybdate he has used a simple aqueous solution.

This would also account for his obtaining a blue precipitate with solution of protochloride of tin. In fact, Mr. F. W. Short, Demonstrator in the Laboratories of the Pharmaceutical Society, informs me that he has been in the habit of recommending $SnCl_2$ as a test for molybdates to his students; but admits that in the case of the nitric acid solution of ammonic molybdate the case is altered, and he is able to confirm my experience that reduction at once takes place to the brown state as described in my note.

To prevent further misunderstanding, I may say that the ordinary molybdic solution is prepared as described in my article on "Water Analysis," recently published in this Journal (*Pharm. Journ.* [3], xviii., page 995).

157, *Grove Lane, S.E.* E. J. Millard.

Erratum—Benevolent Fund List of Subscriptions.—Page 685, G. Cowie, Aberdeen; should appear under Edinburgh, page 689.

J. B. Smith is thanked for the information, of which however we are unable to make use as he desires.

Sodem.—Syrup of white poppies.

Nux Amara.—Reaction would probably take place between the potassium bicarbonate and iodide of iron in the first instance, causing the formation of a precipitate that with occasional opening of the bottle would gradually become red.

W. Cole asks for the formula for "Pulv. Chlor. Co."

Communications, Letters, etc., have been received from Messrs. Shenstone, Stanford, Morrison, Reynolds, Armstrong, Gould and Son.

AN APPARATUS FOR THE ESTIMATION OF NITRITES.*

BY PROFESSOR W. R. DUNSTAN AND T. S. DYMOND.

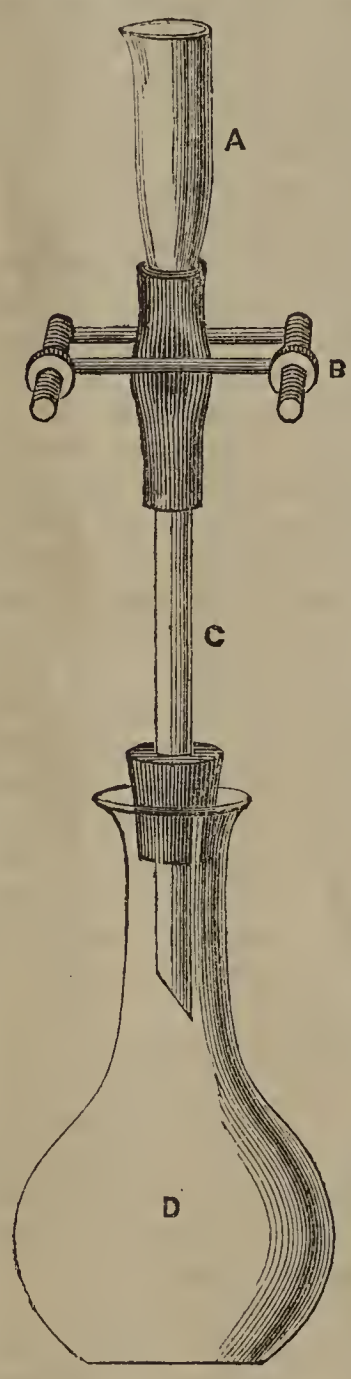
[*Communication from the Research Laboratory of the Pharmaceutical Society.*]

The methods usually adopted for the estimation of the nitrite group in inorganic and organic nitrites are gasometric, and involve the measurement of the nitric oxide or the nitrogen generated by the decomposition of the nitrite. These methods are accurate when applied to inorganic nitrites, and particularly when they are subjected to the refinements and corrections which are practised in other branches of gasometry. For the estimation of organic nitrites, or their alcoholic solutions, these methods are less satisfactory, chiefly because it is not easy to make any accurate allowance for the vapour pressure exerted by the various liquids which are present, or for the solubility of nitric oxide. For the estimation of inorganic nitrites titration of a dilute acidified solution with permanganate is also adopted, but this reaction is not applicable to organic nitrites. There are several difficulties which have hitherto prevented the utilization of the oxidizing action of nitrous acid on hydriodic acid or on ferrous salts as the basis of an accurate volumetric operation, in which the amount of iodine liberated, or of ferric salt formed, is estimated. These chiefly arise from the combination of the nitric oxide set free with atmospheric oxygen and the oxidizing action of the nitrous acid thus generated on the undecomposed hydriodic acid or ferrous salt. Many organic compounds are capable of reducing ferric salts, and this gives rise to a further error. We have lately been able to overcome these difficulties in the reaction with hydriodic acid, and we have made a large number of determinations of the nitrite group in various organic nitrites by titrating, *in an air-free space*, the iodine liberated from the nitrite by an acid solution of potassium iodide. As the method is both simple and accurate, we think that a description of it may prove useful. The process is based on the familiar reaction between hydriodic and nitrous acids, in which nitric oxide is set free and iodine liberated—

$$2HI + 2HNO_2 = 2H_2O + 2NO + I_2.$$

A convenient gasometric method is based on the measurement of the nitric oxide, but one which is not sufficiently accurate for the purpose we had in view when the present process was devised. The liberated iodine is titrated with a standard solution of sodium thiosulphate ($\frac{1}{10}Na_2S_2O_3,5H_2O = 1$ litre) in an apparatus constructed in the following manner.

A stout glass flask having a capacity of about 100 cubic centimetres is closed by a tightly fitting indiarubber cork, through which passes a piece of rather wide glass tubing (C), one end of which (that within the flask) is cut off obliquely so that liquid may flow freely through it. The other end of the tube is connected by means of a piece of thick indiarubber tubing with a larger glass tube which forms a lipped funnel (A). A steel screw clamp (B) regulates communication between the funnel and the tube, and the short interval of indiarubber which is not occupied by glass tubing forms a hinge upon which the flask may be moved into a position at right angles to the funnel, in order to mix by agitation the liquids which are introduced into the apparatus. The absence of any leak in the apparatus is ascertained by boiling about 50 cubic centimetres of water in the flask until steam has continuously issued from the funnel for some few minutes, when the screw clip is quickly closed and simultaneously the source of heat is removed.



A little water is now placed in the funnel and the flask is cooled by immersion in water. On sharply inverting the flask the "click" of the water against the airless flask should be quite distinct. No water should be drawn from the funnel or from any of the joints into the flask and no diminution in the intensity of the "click" should be observed after the apparatus has been standing, neither when the flask is inverted and the funnel empty should any bubbles of air pass through into the liquid. Having thus proved the absence of any leak in the apparatus it is ready for use. We have found that the flask is now free from all but mere traces of oxygen. A conclusive proof of this is obtained by boiling in the flask a solution of potassium iodide acidified with diluted sulphuric acid, and then, after the closed flask has been cooled, the funnel removed and its place taken by a smaller glass tube filled with air-free water, the apparatus is connected with a reservoir of pure nitric oxide. When the clamp is unscrewed nitric oxide is drawn into the flask, and should any oxygen be present nitrous acid will be produced and consequently iodine will be set free. We have often made this experiment and have failed to observe any but an insignificant trace of liberated iodine.*

The estimation of the nitrite is conducted in the following manner. Five cubic centimetres of a 10 per cent solution of potassium iodide, five cubic centimetres of a 10 per cent. solution of sulphuric acid, and forty cubic centimetres of water are introduced into the flask, which is securely fitted with the cork carrying the funnel and tube. The screw clip being open, and a free passage left for the escape of steam, the liquid is boiled. After a few minutes, when any iodine which may have been liberated has been expelled, and the upper part of the flask is completely filled with steam, which is also freely issuing from the funnel, the clip is tightly closed, and at the same moment the source of heat is removed. A little water is now put

* Read before the Pharmaceutical Society of Great Britain, at an Evening Meeting in London, Wednesday, March 13.

* This experiment was successfully performed at the meeting.

into the funnel, and also on the rim of the flask, as a safeguard against a possible minute leakage, and the vessel is cooled by immersion in water. A solution containing a known weight of the nitrite (equivalent to about 0·1 gram of nitrous acid) is placed in the funnel and slowly drawn into the flask by cautiously unscrewing the clip. The liquid which adheres to the funnel is washed into the flask with recently boiled and air-free water, care being taken that during this operation no air is admitted into the flask. When experiments are being made with organic nitrites which are insoluble in water, they are dissolved in alcohol, and alcohol is also used to wash the funnel. When the nitrite is very volatile, a little cold alcohol should be put in the funnel, and the point of the pipette containing the nitrite should be held at the bottom of the funnel beneath the alcohol, and the liquid quickly drawn from the pipette into the flask. The nitrate having been introduced, the flask is well shaken and the liberated iodine is titrated with a standard solution of sodium thiosulphate, small quantities of which are delivered from a burette into the funnel and gradually drawn into the flask; the screw slip renders it quite easy to admit minute quantities of the solution. As soon as the iodine is decolorized any standard solution remaining in the funnel is returned to the burette. Or the funnel may, before the titration is commenced, be replaced by the burette itself, and the standard solution delivered direct into the flask. Starch may be used as an indicator, but it is usually quite easy to observe the complete disappearance of the yellow colour of the dissolved iodine. From the volume of the standard solution used, the amount of nitrous acid is calculated from the equation $2HNO_2+2HI=2H_2O+2NO+I_2$.

It is obvious that the apparatus might be improved in several respects, as, for example, by constructing it entirely of glass, with a ground stopper and tap, as well as by the use of a graduated funnel to deliver the standard solution, and also in other ways. We have intentionally described in this paper the simplest form of arrangement which, for ordinary purposes, answers perfectly well.

The duplicate analyses which are recorded in Table I. show that concordant results are obtained by the use of this method.

Table I.

Duplicate Analyses of Solutions of Ethyl Nitrite.

1st experiment.	2nd experiment.
1·97 per cent.	1·95 per cent.
2·26 ,,	2·25 ,,
2·30 ,,	2·30 ,,
2·04 ,,	2·03 ,,
1·46 ,,	1·44 ,,

Duplicate Analyses of Commercial Sodium Nitrite.

1st experiment.	2nd experiment.
98·5 per cent.	98·5 per cent.

The results afforded by this method have also been compared with those deduced from a measurement of the nitric oxide evolved in the same reaction. These experiments were made in a gas analysis apparatus, and every precaution was taken to ensure accuracy.* The results recorded in Table II. obtained by the two processes agree with each other as closely as can be expected, and quite sufficiently to show that for ordinary commercial analyses the one method may be substituted for the other. Solutions of ethyl nitrite were employed in these experiments and such solutions are difficult to work with because of the volatility of the nitrite. It must be remembered too that the measurement of the nitric oxide cannot be effected with great exactitude, since it is not easy to make an accurate allowance for the vapour pressure of the mixture of iodine, alcohol and water, over which the gas is measured, or for the solubility of the nitric oxide in this mixture.

Table II.

Analyses of Solutions of Ethyl Nitrite.

By Measurement of NO.	By Titration of Iodine.
2·67 per cent.	2·75 per cent.
1·76 ,,	1·72 ,,
1·93 ,,	1·97 ,,
2·66 ,,	2·67 ,,
1·91 ,,	1·95 ,,
1·97 ,,	1·91 ,,
3·12 ,,	3·20 ,,
2·06 ,,	2·05 ,,
4·37 ,,	4·37 ,,
5·25 ,,	5·20 ,,
2·57 ,,	2·50 ,,

As a further test of the accuracy of the process experiments have been made with various organic nitrites of known purity. In each instance a solution of the nitrite was made by weight, and a weighed quantity was used for the estimation. To prevent any loss of these volatile nitrites the experiments were conducted in the following manner:—A well-stoppered bottle half filled with the alcohol corresponding to the nitrite* to be estimated, was weighed. Sufficient of the nitrite was now introduced by means of a pipette to constitute approximately a 2 per cent. solution and the liquid again weighed. The exact strength of the solution having been thus determined the contents of the bottle were well mixed and the neck and stopper of the bottle dried. The bottle was now re-weighed and about 2 cubic centimetres of the solution removed by a pipette, care being taken not to wet the neck of the bottle. The liquid having been introduced into the flask without exposure to air, in the manner which has been previously described, the bottle containing the solution was again weighed. The results which have been obtained are recorded in Table III. As a test of the facility with which the process can be carried out these experiments were conducted by four different workers. It was found that a person possessing moderate manipulative skill experienced no difficulty in obtaining accurate results.

Table III.

Analyses of Organic Nitrites.

Ethyl Nitrite.

Taken.	Found.
·088 gram.	·089 gram.
·176 ,,	·179 ,,
·113 ,,	·115 ,,

* The numbers in the first column of Table II. are therefore much nearer the truth than those which would be obtained by the use of the ordinary nitrometer, so largely employed for commercial purposes.

* The corresponding alcohol was employed to prevent loss consequent on the occurrence of a reverse chemical change which takes place when a lower homologous alcohol is mixed with the nitrite corresponding to a higher homologous alcohol; for example, a solution of amyl nitrite in ethyl alcohol soon becomes a solution of ethyl nitrite in amyl alcohol, from which the ethyl nitrite rapidly volatilizes.

Taken.		Found.
·101 gram.		·102 gram.
·149 „		·151 „
·1787 „		·1797
·1437 „		·1450 „
	Propyl Nitrite.	
·2062 „		·2063 „
·2028 „		·2039 „
·2485 „		·2493 „
·1899 „		·1901 „
	Butyl Nitrite.	
·1824 „		·1850 „
·1756 „		·1770 „
·1513 „		·1512 „
·1564 „		·1581 „
	Amyl Nitrite.	
·1314 „		·1316 „
·2026 „		·2048 „
·2188 „		·2215 „

It will be noticed that the amounts of nitrite obtained are a trifle higher than those actually taken. This small difference is doubtless the result of several circumstances. Some of the nitrites examined contained traces of dissolved "nitrous fumes," and it is also probable that minute traces of air adhering to the sides of the funnel were drawn, with the liquids, into the apparatus. This latter difficulty might easily be overcome, were it worth while, by the adoption of further precautions. For ordinary purposes the plan as it is described in this paper is quite sufficiently exact, since the error, at the most, does not exceed the tenth of a cubic centimetre of the solution of thiosulphate.

There is no doubt that the apparatus may be conveniently employed in other operations in which it is necessary to accomplish a chemical reaction in an air-free space.

[*The discussion on this paper is printed on p.* 747.]

NOTES ON EGYPTIAN OPIUM AND SOME OTHER DRUGS OF THE CAIRO BAZAARS.*

BY WILLIAM MARTINDALE.

During a recent visit to Egypt I was much interested, as everyone is who visits the place, by the picturesque appearance of the Cairo Bazaars, and, having made inquiry at a wholesale drug house, regarding the cultivation of Egyptian opium, Signor Bossi, the manager, kindly went with me through the native drug bazaar, and acted as an interpreter.

He said that opium was collected, and the poppy cultivated for its production, at Akmim (the ancient Panopolis), on the right bank of the Nile, about 320 miles above Cairo, and a little of inferior quality at Assiout (or Siout, the ancient Lycopolis) on the left bank, about 250 miles up. It was offered to them at times, but was not dealt in by his house, because it was so much inferior to Smyrna opium. It is used by the natives, and is sold in the bazaars to which he accompanied me.

The piece of Akmim opium which I bought is a hard flat cake, about four inches in diameter by one inch in thickness. It has the mark of a leaf adhering to it, and is rough and irregular in appearance.

The Assiout opium is in segments of a cake, much softer than the other, and is very inferior and adulterated in quality. Mr. Salter has examined some of each, and finds the crude samples to contain as follows:—

Akmim opium. 7·24 per cent. of morphine.
Assiout „ 0·6 „ „ „ „

Owing to my limited time, and not having booked a passage beforehand, I was unable to proceed any distance up the Nile, else I should have visited Assiout, the terminus of the railway, at which passengers join the Nile steamers for the quick trips up to Luxor and Assouan. Akmim is nearly opposite to Sohag, one of the landing stations of the boats, about seventy miles above Assiout.

I exhibit two specimens of the Egyptian poppy capsules, showing the incisions from which opium has been obtained. I saw poppy heads, on stalks, tied in bundles of about a dozen, exposed for sale. These were not incised, but had been freed from seeds, which are used separately as food.

Soap root is much used for cleaning silks and other fabrics. It is not collected in Egypt, but is principally imported from Syria, where, I was informed by Said Gawadd, a Syrian pharmacist, it grows abundantly. There appears to be more than one kind of it in use. One is said to be obtained from *Gypsophila Struthium*, and to contain saponin, but Mr. Holmes thinks, from the appearance of the starch, that the sample of root which I exhibit, is obtained from some leguminous plant. It is very mucilaginous, but appears to contain little saponin.

I noticed in one part of the bazaar, a row of deep narrow granite mortars fixed in front of the shop, and on one occasion two Arabs were powdering some soap root, with iron pestles a little more pointed than those in use with us, pounding alternately in the same mortar, like a couple of blacksmiths. An array of primitive sieves was seen in the interior.

I exhibit some roots, one end of which is made fibrous, to serve the purpose of a toothbrush. These are the roots of *Capparis Sodada*. They are used like the Jamaica chewsticks. They have a slightly salt and agreeable flavour.

I noticed that styrax bark, from *Liquidambar Orientale*, was frequently exposed for sale; it is in small agglomerated pieces of a reddish-brown colour, and is mentioned by Hanbury under the name of *Cortex Thymiamatis*. It has an agreeable odour, and is used for burning as a perfume. It is from this bark that the liquid styrax has been pressed.

From a dealer in perfumes I bought some incense sticks, which are about 4 to 6 inches in length and three-eighths of an inch in diameter. The burning material is rolled around a fine wooden spill, like the wick of a candle. Their composition is similar to that of our fumigating pastilles, and apparently includes styrax and cascarilla barks. I also obtained from him some perfume tablets for burning, which he much prized. They are gilded, and contain much resin, probably mastiche, frankincense and styrax. He also supplied me with a little mastiche for burning, some cascarilla bark, and a resinous substance which he valued highly, it having been brought from Mecca. This, on comparison with a specimen in the Museum, proves to be Palembang benzoin.

The pods of *Acacia Arabica*, of which I obtained a small specimen, contain a quantity of astringent

* Read before the Pharmaceutical Society of Great Britain, at an Evening Meeting in London, Wednesday, March 13.

matter, and are used for dyeing, striking a black colour with iron.

Henna, the powdered leaves of species of *Lawsonia*, is also largely exposed for sale, and the stained finger-nails of many of the women and children give evidence of its use.

The fruits of *Zygophyllum coccineum*, which have an aromatic odour and a bitterish acrid taste, are used, I was informed, as a remedy for ophthalmia, which, in various forms, is very prevalent among the natives. They are said to have been used by the old Arabian physicians, and Mr. Holmes finds that the leaves of *Zygophyllum simplex*, which has much smaller fruits, are also used by the Arabs in eye diseases.

I also show some large pods of *Albizzia Lebbek*. This is commonly known as an acacia, and is much cultivated about Cairo and Ismailia. If its roots have access to any moisture from irrigated soil, it grows to the height of 40 or 50 feet. It thrives in a climate where no rain falls, and where few other trees, except palms, grow to any height. There is an avenue of these trees all the way from Cairo to the Pyramids of Ghizeh, a distance of about 8 miles. This tree is said by Martius to yield a gum allied to gum senegal, but I did not see such an exudation on any of the trees I examined.

The seeds of *Arachis hypogœa*, known as *Pistache de terre*, ground nuts, beans of Soudan (*Soudani "foule"*), are hawked about most of the streets of Cairo, and are considered to possess aphrodisiac properties.

Signor Bossi informed me that little or no senna now passes through Cairo. It finds its way into European commerce principally through Tripoli, and the same remark applies to gum arabic, which finds its way principally from the Red Sea ports to Trieste.

In conclusion, I may mention that there appear to be no restrictions on the practice of pharmacy in Egypt. There is no pharmacist holding the English qualification in business in Cairo, but there are pharmacies in the hands of French, Germans, Greeks and Syrians, at most of which English is spoken.

10, *New Cavendish Street, W.*

[*The discussion on this paper is printed at p.* 748.]

WINE FROM CURRANTS.*

The process of wine-making at Patras from dried currants is exceedingly simple. The fruit is emptied out of the barrels or sacks in which it arrives into large wooden tubs, of a capacity of several tons, and twice or thrice (according to the quality and strength of wine which it is intended to produce) the amount of water is added. During cold weather it is necessary to artificially heat the water to an average summer temperature, otherwise the fermentation would be too long delayed, but under ordinary circumstances the fermentation has taken place, and the liquid is ready to be strained in a period from eight to ten days. When this last operation has taken place, the liquid is ready for immediate use, and can in no way be distinguished from ordinary light wines; it is of a light-ruby colour, and possesses a strength, according to the amount of water that has been added, of from 9° to 13°. Wholesale dealers usually sell it at so much per degree of alcoholic strength. It is also employed for the manufacture of superior brands of wine, and this is done by the admixture of strong and coloured Spanish, Italian, and Dalmatian wines, and by various other processes well known in France. This should not, however, cause any prejudice against similar wines, for they contain nothing deleterious or in any way injurious to the consumer, for the currant in its original state is simply a small stoneless grape, which produces an excellent, strong, fruity-flavoured wine; the French, therefore, in adding water to the dried fruit are merely replacing what has been drawn out of it by the action of the sun in the process of drying. Considering how much spurious wine is put on the market nowadays, I think one has reason to congratulate himself, if he can be perfectly certain he is drinking nothing worse than the liquid produced by the admixture of currants with water. Currants are likewise consumed to a great extent during the vintage by farmers and proprietors of vineyards in France, who produce ordinary qualities of wine and who, owing to the remunerative prices paid for their wines, are anxious to increase their product as much as possible. Experience has shown them that if currants, with the usual proportion of water, are mixed during the vintage with fresh grapes and allowed to ferment together, the blending is much superior to that obtained by mixing a currant wine to a natural wine, and the liquid obtained has all and every attribute of a pure, natural wine. The most careful chemical analyses have declared this, and it is, therefore, not to be wondered at if many wine-growers in France avail themselves of this to make up, in a small way, for the enormous deficit caused by the ravages of the phylloxera, which, if I am not mistaken, has reduced the total French wine production from an average of about 60,000,000 hectoliters of wine to about 30,000,000 annually. I may add that the 40,000 to 50,000 tons of currants annually imported into France, when turned into wine, represent only 1,500,000 hectoliters, so there is plenty of room for the further development of this trade.

* From a report by U. S. Consul Hancock in the *American Druggist.*

EPIPHYTIC VEGETATION OF THE TROPICS.

Dr. A. F. W. Schimper has published a second instalment of his magnificent work on this subject, this portion relating to the flowering plants and vascular cryptogams. The order by far the most largely represented is Orchideæ, of which 119 species are enumerated in tropical America alone. Next cames Filices (American only) and Bromeliaceæ 18 each, Gesneraceæ 16, Rubriaceæ 14, Ericaceæ 13 and Melastomaceæ 10. The largest number of epiphytic plants are found on the arboured vegetation of mountain slopes in tropical and subtropical countries. Some species, but only those found on the lower branches of trees, grow also on rocks. The author describes the different ways in which the seeds of epiphytes are adapted from their peculiar habit. The most common contrivance is that they are provided with a succulent envelope which is devoured by animals, and the seeds themselves then voided on to the branches of trees; or they are so small as to be carried readily by the wind to fissures in the bark, as in the Orchideæ; or they are provided with a floating apparatus. Excluding true parasites, their nutrition is obtained in several ways. They may find their nutriment on the moist surface of the host, and are then usually protected against desiccation by the presence of receptacles for holding water. Others have aerial roots for absorbing moisture, like the orchids, or roots which reach the surface of the soil; while others again form for themselves a matrix of decaying animal and vegetable matter.

The Pharmaceutical Journal.

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Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

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WEIGHTS AND MEASURES BILL.

THE Bill for amending the law relating to weights and measures and for other purposes connected therewith, which was read a first time and ordered to be printed on the 28th February, is essentially the same as the Bill that was before the House of Common last session. It provides that within twelve months of its becoming law every weighing instrument used for trade purposes shall be verified and stamped by an inspector of weights and measures with a stamp of verification. Also that every person who uses or has in his possession for use in trade, any weighing instrument that is not stamped as the law requires shall be liable to a maximum fine of two pounds, or in the case of a second offence five pounds. The term "weighing instrument" is here used to designate and include ordinary scales with the weights belonging thereto, scale beams, balances, spring balances, steelyards, weighing machines and other instruments for weighing. In the event of this Bill passing, therefore, it will be necessary not only to provide for the accurate adjustment of weighing machines and apparatus in order to satisfy the requirements of the law, but it will also be necessary to obtain an official verification of their accuracy. The provisions of the Bill to this effect are an amplification of the existing Act, and in regard to the carrying out of this work it is proposed that inspectors of weights and measures may charge fees for the verification and stamping of weighing instruments as well as weights and measures, and a schedule of charges is appended to the Bill, specifying the amount of fee for weights ranging from 100 pounds to half a grain, for apothecaries subdivided measures from 40 ounces downwards, and for the various kinds of weighing instruments.

Notwithstanding the power conferred upon local authorities to provide for the efficient carrying out of the Weights and Measures Act, 1878, and the obligations imposed upon them to procure standards, to appoint inspectors, and to make regulations for their guidance in the execution of their duties, it has been found that there was in some instances need of executive power on the part of the Board of Trade to make up for deficiencies on the part of local authorities. Several of the clauses of the Bill now before the House of Commons appear to be directed to this state of things. Thus, for instance, the eighth clause provides that every local authority within the meaning of the principal Act and every other person or authority having power to appoint inspectors of weights and measures shall make general regulations for the guidance of the inspectors appointed with respect to the procedure to be observed in the verification and stamping of weights, measures and weighing instruments and the inspection of the same. Further to provide for the disregard of this requirement a subsection of the clause provides that if there be any failure to comply with it the Board of Trade may make such regulations, and that in such case any regulations so made shall have effect as if made by the local authorities. In like manner Clause 2 provides that the Board of Trade may, if thought fit, deposit with any local inspector of weights and measures and at the expense of local authorities copies of any of the metric standards in the custody of the Board, and cause them to be used for the verification of metric weights and measures, as provided by Section 38 of the principal Act. By Clause 5 the Board of Trade is further empowered to cause new determinations of standards for the measurement of electricity, temperature, pressure, or gravities to be made as may from time to time appear to be required for use in trade.

Another important feature of the Bill is the provision in clause 9 for testing the qualifications of inspectors of weights and measures. This is a most necessary proceeding, and for that purpose the clause states that the Board of Trade shall provide for the holding of examinations to ascertain whether persons acting as inspectors of weights and measures possess sufficient practical knowledge for the proper performance of their duties, and for the grant of certificates to persons who satisfactorily pass such examinations. After the passing of this Bill no person who is for the first time appointed to be an inspector of weights and measures is to act as such, unless he has obtained such a certificate from the Board of Trade. It appears that this provision of the Bill opens up a possibility that the inspectorships in some provincial places would be appointments worth the consideration of chemists and in which their acquaintance with the use of instruments and with manipulation would be very serviceable, and give them a decided advantage as candidates for the office of inspector of weights and measures. We notice in the Bill now before the House of Commons one of the sections of the Act it was formerly proposed to repeal has been omitted, namely, section twenty-two, containing exemptions with respect to vessels not represented as contain-

ing any amount of imperial measure. This exempting section was originally inserted at the instance of the licensed victuallers, and the omission of the repeal of it has now been secured by the action of the body representing that trade. We mention this circumstance as illustrating one of the advantages resulting from united trade organization, and as showing how useful that may become in dealing with matters which affect the interests of a class.

SHOP HOURS LEGISLATION.

In connection with the case reported in this Journal on the 2nd inst., it may be useful to point out to our readers that chemists are not exempt from liability under the provisions of the Shop Hours Regulation Act of 1886. The object of that Act was to provide a remedy for the injurious effects resulting from the lengthy period of employment of young persons in shops and warehouses, and the third section of the Act provides that a young person who is under the age of eighteen shall not be employed in or about a shop in any one week for a longer period than seventy-four hours, including meal-times. The same section also prohibits the employment of any young person who has previously been employed on the same day in any factory or workshop for the number of hours permitted by the Factory and Workshop Act of 1878. The fourth section of the Act provides that in every shop where young persons are employed a notice shall be kept exhibited by the employer in a conspicuous place, referring to the provisions of the Act and stating the number of hours in the week during which young persons may be lawfully employed there. The penalty for any breach of the law in this respect is a fine not exceeding one pound for any person so employed, and although in the case referred to the magistrate decided that it was not proved that the alleged breach of the Act by employing a boy for too long a period had been committed, the mitigated penalty of seven shillings was imposed for omitting to exhibit the requisite notice in the shop. In order to avoid any inconvenience in connection with this Act, it will be advisable for chemists who employ young persons under eighteen years of age to obtain a copy of the Act, which costs three halfpence, and hang it up in their shops as directed.

In close relation to the Shop Hours Regulation Act is the proposed legislation for the purpose of extending to shops the Saturday half-holiday which has become customary in many other business occupations. The Bill introduced under the title of the Shops (Weekly Half-holiday) Bill, by Sir John Lubbock, proposes to make the weekly half-holiday compulsory for certain trades whenever two-thirds in number of the occupiers of a particular class of shops sign an application to the local authorities to make an order for the closing of such shops on one specified day of the week at or before any hour not earlier than two o'clock in the afternoon. In such a case the other third would be compelled to close their shops in the same manner or become liable to a penalty of five pounds. Pharmaceutical chemists and chemists and druggists are to be exempt from the provisions of this Bill so far as relates to the supplying of medicines, drugs, or medical appliances after the hour appointed for closing, but they are not thereby to be authorized to keep their shops open after that hour. The other exceptions to the operations of the proposed Bill are premises in which any intoxicating liquor is sold by retail for consumption on the premises, refreshment houses, tobacconists' shops, and news agencies. These, it may be mentioned, are trades in which internal organization for the general benefit has been developed in such a manner as to render legislative interference with their conduct difficult, if not dangerous, to undertake. Members of the pharmaceutical community may at least congratulate themselves that considerations for the public convenience have been allowed to operate to some extent in the same direction.

In reference to some communications that have reached us on the contemplated intention of the Board of Inland Revenue to demand from persons who use methylated spirit in making aconite or belladonna liniment a bond for two hundred pounds, we may state that we have reason to believe that demand will not be enforced, but that the Board will adhere to the plan of permitting the use of methylated spirit for the preparations mentioned. It must of course be understood that the use of methylated spirit in that way would not be thereby authorized in any other cases than those where liniments made with methylated spirit are specially demanded for veterinary practice or to meet the requirements of hospitals.

* * *

At a meeting of the Annual Dinner Committee, held last Wednesday at 17, Bloomsbury Square, it was decided that the dinner should take place at the Freemasons' Tavern, and that the general arrangements in regard to stewards, etc., should be the same as on previous occasions. Gentlemen who are willing to act as stewards should at once forward their names to Mr. Richard Bremridge, in order that they may be included in the list that will shortly be published. The following gentlemen were appointed to act as a committee for making and carrying out the arrangements for the dinner. The President, Vice-President and Treasurer of the Pharmaceutical Society, Professor Attfield, Dr. Paul, Messrs. Allen, Barron, Bourdas, Butt, Hills, Mason, Taylor and Tupholme, with Mr. R. Bremridge as Honorary Secretary.

* * *

We understand that under the terms of the will of the late Mr. John Williams the Benevolent Fund will receive the sum of £100, free of legacy duty.

* * *

At the next meeting of the Chemists' Assistants' Association, on Thursday evening, March 21, a paper will be read on "The Microscope in its Application to Pharmacy," by Messrs. E. Richards and F. A. Rogers, which will be illustrated by sections, crystals and microphotographs, exhibited in How's microlantern with the lime-light.

Transactions of the Pharmaceutical Society.

EVENING MEETING IN LONDON.

Wednesday, March 13, 1889.

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

An evening meeting of the Society was held on Wednesday, the 13th inst., at 17, Bloomsbury Square. The chair was taken at 8 o'clock by the President.

The first paper read was on—

A New Process of Estimating Nitrites.

BY PROFESSOR DUNSTAN AND MR. DYMOND.

The paper is printed at p. 741, and gave rise to the following discussion :—

The President remarked that this was an application of chemical principles to a sort of apparatus, the parts of which every chemist, even in an out of the way country district, would probably have by him, by means of which it was possible to determine with accuracy the purity of those organic nitrites, the use of which in medicine was increasing enormously, and the therapeutic effect of which was essentially dependent on the purity of the substance dispensed.

Mr. John Moss said he had watched this process with a good deal of interest, but he could hardly agree that a chemist in an outlying country district was likely to have the apparatus necessary to apply this test to his sweet spirits of nitre. No doubt a gentleman with all the resources of the Research Laboratory behind him would find this a very simple and effective apparatus, but he questioned whether a country chemist would do the same. The test appeared to be an extremely neat and sharp one, and the only point that suggested itself to him was that having to pour back some of the thiosulphate solution into the burette might be a source of some little error, as some of the thiosulphate would be sure to remain on the inner surface of the little funnel. He noticed in the list of organic nitrites the statement that ·088 gram of ethyl nitrite was taken and ·089 found, and so on all down the list. He did not know, however, how so small a quantity as ·088 gram of ethyl nitrite could be estimated, and others besides himself would no doubt be interested to learn how it was accomplished.

Professor Attfield said he admired the way in which a link had been supplied in the chain of old reactions by the elimination of air from the flask by the ebullition of water. The principle was not new, being one which he believed Professor Miller of King's College was almost the first to apply in getting rid of air in the estimation of the amount and kind of the gases dissolved in ordinary water. He also admired the accuracy which seemed to be associated with this method. He, however, should do the opposite of what Professor Dunstan seemed to have done, and instead of checking the titration method by that of the measurement of nitric oxide, he should check the latter method by the former, which it seemed to him must be the more accurate. Trying it in that way it seemed that the method of measurement was after all very good, which was gratifying, because it had been largely used and was highly recommended.

Mr. Dymond drew attention to the fact that the essential part of the apparatus was that which anyone might be supposed to have ; it was merely a little flask with a tube, another piece of tube on the top and an india-rubber cork, with a piece of indiarubber tubing and an iron clip, and this would be found in almost any country pharmacy. It was considered that this method was superior to that of the measurement of the nitric oxide because the solubility of that gas was not known. It was not even known with accuracy what was its solubility in water, far less in mixtures of alcohol and water. Its solubility in water was about 5 per cent. and in ethyl alcohol about 25 per cent., and in mixtures of course there would be all gradations between the two. What it was in other alcohols was not known. It would really take long investigation, and would be a matter of impossibility to correct each result obtained for this solubility, as the differences in the table where the analyses of solutions of ethyl nitrite were given would show. A few years ago he did some work on Eykman's process for the estimation of the nitrites, and always found that it gave too low results, Eykman having made no correction for the solubility of nitric oxide, but it was evident that to that cause the low results of the process were due. Allen's process gave more incorrect results still, because usually alcohol was present in the liquid.

Professor Attfield said the table appeared to indicate there was no great loss by the measurement process, but perhaps it was to be farther explained.

Professor Dunstan thought that Professor Attfield had misunderstood the diagram; it did not exhibit the results of the new method checked by the old, but was merely a comparison of the results obtained by the two methods. The accuracy of the new process had been checked by using weighed quantities of pure nitrites.

Professor Attfield said he understood that was so in the measurement process, and the difference was only in the second place of decimals. There was this difference, no doubt, and it was desirable that chemists and physicists should have even a more correct method than the old measurement process ; but when it came to be applied to pharmacy, if he understood rightly, the results of the measurement method were quite near enough for all pharmaceutical purposes. He was no advocate of loose methods, but the measurement method was clearly very good on the authors' own showing.

Mr. MacEwan thought Professor Dunstan and Mr. Dymond, in speaking about the solubility of gases in water, as far as Allen's method was concerned, had overlooked the fact of the comparatively little water with which the nitric oxide could mix. The solution of potassium iodide was poured in over a long column of brine, where it would only occupy a space of perhaps three-quarters of an inch, and the nitrous ether half an inch, so that when mixed there would be really only 15 cubic centimetres to deal with, where the errors would be comparatively small. Some six years ago he was working on spirits of nitre, and Mr. Dott at the same time, although independently, applied exactly the same method as was now brought forward. He was seeking for a process which any chemist or druggist could apply, but he doubted whether in every pharmacy there was to be found a burette, which was even more essential in this process than an ordinary flask. Mr. Dott tried to get rid of the objection to the nitric oxide turning into a higher oxide and liberating more iodine, by using bicarbonate and having an atmosphere of carbonic acid gas; but the method was not exact, by any means, because scientific accuracy could not be attained except under such conditions as were proposed by the authors. But for a fairly rough method that any druggist might apply it was pretty good, and the results compared favourably with Eykman's and Allen's methods. For the purpose for which the authors had brought forward this paper, it was unquestionable that they had solved a difficulty, and that other chemists who were working with nitrites would appreciate it.

Professor Dunstan, in reply to Mr. Moss, pointed out that as already remarked by Mr. Dymond, the apparatus consisted only of a flask, a piece of glass tube, and

an indiarubber cork, and, as the President reminded him, of a burette. What he wished to point out was that the method was at least as simple and more accurate than that ordinarily recommended, which involved the use of a nitrometer. The results recorded on the table showed that for practical purposes the measurement of the nitric oxide, if subjected to certain corrections, gave results quite sufficiently accurate for commercial purposes. With regard to the sodium thiosulphate solution which was poured back into the burette he should say that they had purposely shown a very simple form of apparatus, but if more accurate results still were desired a graduated funnel might be used or a burette might be substituted for it during the titration. With reference to the small quantities of ethyl nitrite used they were obtained either by measuring the ethyl nitrite gas, and that could be done quite accurately, as the volume occupied would be very large and could be accurately estimated by proper apparatus, or by using the ethyl nitrite in the form of a solution of 3 to 4 per cent. in alcohol, they would then be actually dealing with much larger weights than ·088 gr., and there would be no difficulty about it. They had not attempted to check the titration method by the method of measuring the nitric oxide, but merely to show to what extent the two methods agreed. Allusion had been made to the accuracy of the results obtained by the nitrometer. Their inaccuracy depended on the solubility of the gas and also on the vapour pressure of the liquid. It had been stated that the error arising from the vapour pressure compensated almost exactly that arising from solubility, that the vapour pressure which tended to increase the volume of gas compensated for that which was removed owing to its solubility, but he did not think that could be relied on. He was familiar with the method, founded on the same reaction, which had been proposed by Mr. Dott. It must be open to considerable error, owing to oxidation and the formation of nitrous acid. As regards the use of an atmosphere of carbon dioxide, there was much difficulty. Nitrite of ethyl, for instance, was so very volatile, that if any gas passed over the surface of a liquid in which the nitrite was dissolved, a considerable quantity of it would be lost, and in working with very small quantities all these difficulties must be taken account of. What was required in order to establish the accuracy of any method was a series of recorded results obtained from pure nitrites or from solutions of known strengths. They had taken a great deal of trouble to obtain such a series, working with pure nitrites, and were able to say that the method now proposed was perfectly reliable, and would probably be found to possess several advantages over that which involves the use of a nitrometer.

On the motion of the PRESIDENT, a vote of thanks was passed to the authors.

The next paper was entitled—

NOTES ON EGYPTIAN OPIUM AND SOME OTHER DRUGS OF THE CAIRO BAZAAR.

BY WILLIAM MARTINDALE.

The paper is printed at p. 743, and gave rise to the following discussion :—

Mr. HOLMES said when he heard that Mr. Martindale was going to Egypt he thought it was an excellent opportunity of solving a difficulty he had met with concerning the commerce of Egyptian opium. In the 'Pharmacographia' (p. 47, 2nd ed.), the Egyptian opium was stated to be met with in European commerce, but a little further on (p. 48) there was another statement to the effect that all the opium produced in Egypt was used in that country. As these statements appeared a little contradictory, he thought Mr. Martindale might be able to solve the difficulty, and the information he had brought forward to-night taken in conjunction with what Mr. Wink had had told him that evening might throw some light upon it. Mr. Wink had kindly brought some specimens of Egyptian opium as it now came to this country; this appeared to be quite a different thing to the opium which formerly came under that name, and of which there was a specimen in the Museum containing about 9 per cent. of morphia, whilst this contained about 6 per cent., or about half that yielded by Turkey opium. The opium which Mr. Martindale had brought appeared to be made in Egypt and not exported, but that now sent to this country, which Mr. Wink said came from Alexandretta, appeared from the specimens to be opium of Turkish or Persian origin, diluted in Egypt, and then exported. The specimen brought by Mr. Wink was evidently intended to imitate the Malatia opium, a good variety usually sold as "shipping opium." The little incense tablets shown by Mr. Martindale had their counterpart in the *Kyphi* of the ancient Egyptians. The latter were little balls of incense which were used by the ancient Egyptians for fumigation, and also in medicine. Through the kindness of Mr. Percy Newberry, he was able to place on the table one of these found by Mr. Petrie in his explorations in Egypt, which appeared (as far as he could ascertain by soaking it in water and examining the particles which then separated) to contain mastic, frankincense, with some fragrant wood like cedar, and it was apparently similar in composition to the little pastilles Mr. Martindale had brought, which differed, however, in having some more modern fragrant substance such as cascarilla bark. With regard to the soap root, this was not the article commonly called the Egyptian soap root, which came from a species of *Gypsophila*, a plant belonging to the *Caryophyllaceæ*, and which differed entirely from this in having a hard bark, whilst this was of quite a fibrous character. Ordinary soap root was also much more saponaceous. The root brought by Mr. Martindale gave very little froth with water, and if a little were put under the microscope it was obvious that the starch had the characteristic shape and the long hilum of leguminous starch. An Egyptian soap root was attributed by Professor Bernardin to *Balanites ægyptiaca*, a plant belonging to the order Olacineæ, but as there was no specimen of that in the Museum or at Kew for comparison, he was not able to determine whether the starch of that family had the same characters as that of the Leguminosæ or not. The curious fact of its being gathered in Syria and sent over to Egypt indicated that it could not really be classed as an Egyptian soap-root. The pods of *Acacia arabica* formed a regular article of commerce in India, and had been sent over to this country on various occasions, but good authorities said that we had far better dyes and tanning materials, the pods containing only about 10 per cent. of tannin; and unless an extract could be made and sent over it would not pay to use them either as a tannin or dyeing material. The fruits of the *Zygophyllum coccineum* which Mr. Martindale had brought exactly corresponded with those of that species in the Kew Herbarium, in size and shape, and it was interesting to find that this plant was used in ophthalmia, as so few plants of the order were used in medicine. He found the fruit acrid, pungent, and apparently mucilaginous, and no doubt it possessed some active properties which would be worth investigating, considering how little was known of the medicinal properties of the plants of that natural order.

The PRESIDENT moved a vote of thanks to Mr. Martindale, who he was glad to see so much improved in health by his journey to Cairo.

Mr. HOLMES then drew attention to a few specimens on the table. The curiously shaped bottle was one sent from Bombay by Mr. Prebble, who now had the business formerly belonging to Messrs. Kemp and Co., and he had sent it in response to a request for a specimen of oil of screw-pine (*Pandanus odoratissimus*), free from sandal-wood oil. In India sandal-wood was always added to any fragrant substances which were distilled, and it was almost impossible to get essential oils from India which did not contain sandal-wood oil. Mr. Holmes showed in illustration of this fact a specimen on the table, which seemed to be very fragrant, but had an odour of sandal-wood oil, which to a certain extent spoiled it. The bottle contained water distilled from the flowers of the screw-pine. It was an article of commerce between Persia and Bombay, but the odour of this specimen did not seem in any way superior to that of rose water. There were two specimens of cascara sagrada presented by Mr. J. Hartford, of New York, and some very fine ones of Oregon cascara presented by Mr. Moss, who allowed the Curator to select a series of specimens, to show the extent to which the bark varied in thickness and colour. The colour of the inside of the bark was by no means an indication of the species or kind of bark, but simply depended on the drying. The specimens sent by Mr. Hartford were accompanied by a letter, which threw some new light on the geographical source of the article at present in commerce. This letter, which was as follows, was then read—

"As to cascara, I see from Mr. Moss's paper that the specimens I thought spurious turned out genuine after all. Indeed, a short time ago, from inquiries I made about them, I came to the same conclusion myself. By this mail I send you two samples of what we now in the trade here call 'cut' or winter bark, to distinguish them from the true *Rhamnus Purshiana*, peeled in the early summer. The sample No. 1 can easily be recognized as cascara; this has simply been cut off the branches with a draw knife or spoke-shave and dried. It is much superior to No. 2, which as far as I know is also true bark, but got by partly steaming the branches to soften the bark, which is then removed by knives. It is a fact well known to the manufacturers here that cascara, like *Rhamnus Frangula*, ought to be at least two years old before being used. Medical men will confirm this, in fact two or three years' old bark should always be used. Kindly call the attention of the trade to this point, for I think it is a matter they do not see the importance of. The sample of cascara I send, No. 1, is collected in the district where what is known as the genuine *thin* bark is collected, viz., in the northern portion of the state of California bordering on Oregon. The great bulk of the bark sold during the last two years actually came from Coos County, in Oregon, Marshfield being the principal depôt; from there it is shipped to San Francisco, and thence overland, or viâ rail to New Orleans, and thence by steamer to New York. From Portland in Oregon also comes large quantities of the thin bark. Further north, from Scattle in Washington territory, comes the thick Oregon bark, as it is called; this comes by rail, or by rail and water, viâ the great lakes. From this district the sample No. 2 reached this market. You will therefore notice that what is called *Californian* bark really comes from Oregon, or at least it is shipped from there, and the *Oregon* bark comes from points much further north, viz., Washington territory. These names are however mere trade names, and are really only used to distinguish the so-called *thick* and *thin*. I have seen some very fine thin bark from California, got not 50 miles north of San Francisco, and I think this was the kind of bark originally sold as cascara, but this is now rare, for it costs more to collect, is scarce, and cannot compete in price with the thicker bark from the north. Mr. Moss is quite right in what he says about the medicinal qualities of the *thick* bark, it is quite as good as the thin, only I have an idea that it ought to be kept longer before being used. A great deal of the bark from Coos County is of a brownish colour outside, and few of the pieces show any of the silvering like the birch, it is also generally in small flat pieces, while the thick bark sometimes comes in pieces (quills) two feet long, beautifully silvered on the outside; more of it is the colour of elm bark on the outside and covered with moss; this, of course, from the damp climate where it grows. As to the colour of the inside, really there is not much importance to be attached to it, for all depends on the drying. People naturally prefer the light buff colour, but a deep walnut shade is in my opinion no detriment to the quality. I have seen it black, but only from bad drying. The bark is collected from the end of April to June, after that it will not peel easily; this year, owing to scarcity, it may be collected (if possible) earlier, but as it will take a month or more to dry, pack and strip, the new bark is not expected before July in San Francisco, in August here, or September in London. I will try and get you green specimens of the twigs, leaves and flowers of all the kinds I can, when the season opens. It may interest you to know that fully 300,000 lbs. will be required to supply the home and export consumption the coming season. There is no medicine of American origin now used so extensively as cascara, and the demand keeps growing; senega root, the export demand for which is 100,000 lbs. a year, is quite left in the lurch. I therefore never expect to see the price 28*s.* cwt. again; in fact, such a price was brought about by over-production, for it always actually cost more to market it. Indeed, I agree with Mr. Moss that it would not be a matter for surprise if there was a short supply of it in a year or two. One point worth noting is this: the owners of the ranches and properties where the bark can be collected will, from the high price it has reached this year (2*s.* 6*d.* lb. here now), see a prospect of making a good thing out of it, and will not allow promiscuous gathering as heretofore, but will probably make the collectors pay for the privilege of peeling; this alone in my opinion will tend to make the price high in future, and may prevent the trees being exterminated. I do not speak on this point from positive knowledge, but one of the largest collectors, who wants to sell me 20 tons, to be delivered in August or September, says he had to pay a high price for the right to collect the bark in a certain district in Washington territory."

Mr. Holmes said he gathered from this that the bark was now becoming comparatively scarce in these districts in California in which it was first obtained, and all the larger trees had probably been exhausted, so that practically all the Californian bark was small; but further north it was obtained of larger size, because those districts had not been exhausted and naturally larger trees were still to be found. Of course the thin came mixed with the thick, for the simple reason that thinner bark was yielded by the branches than by the trunks of the same trees.

The PRESIDENT moved a vote of thanks to Mr. Holmes, and the meeting then adjourned.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on the 6th instant. Present, the President, Mr. James E. Brunker, M.A., in the chair, the Vice-President (Mr. Draper), Messrs. Charles Evans, Wells, Grindley, Merrin, Doran, Hayes, Simpson, Allen, Professor Tichborne and Hodgson (Treasurer.)

A letter dated February 18 was read from Mr. John Gilbert, L.P.S.I., of Ennis, stating that he was a candidate for the apothecaryship of the Ennis Lunatic Asylum; but that the inspectors of lunatic asylums had held that he was ineligible for the office because he was not a licentiate of the Apothecaries' Hall. He had an interview with one of the inspectors, Dr. Hatchell, who adhered to that view, notwithstanding that he called his attention to the 34th section of the Pharmacy Act of 1875, viz.:—"Any person registered as a pharmaceutical chemist under this Act shall be qualified to be appointed to and to hold the office of apothecary in any district, lunatic asylum or county gaol or prison in Ireland, but shall not be entitled to prescribe for patients."

Another letter from Mr. Gilbert, dated March 4, and addressed to the President, was also read. It forwarded a copy of rules and regulations for the management of asylums made by the Privy Council on February 23, 1874. It would appear—the writer stated—that the inspectors of lunatic asylums considered that as the apothecary of an asylum was required "to assist in the infirmary, or in any other part of the institution where his services are needed, but shall not prescribe for patients except on urgent occasions, or in the absence of the resident or visiting physician," a pharmaceutical chemist was not eligible. Of twelve gentlemen holding the office of apothecary in Irish asylums—Mr. Gilbert continued—eight are pharmaceutical chemists, and the late Mr. T. T. Seymour held that post in the Ennis Asylum from 1878 till his decease in 1881. As the appointment to fill the vacancy caused by the resignation of Mr. Seymour's successor would be made on the following Saturday, March 9, Mr. Gilbert trusted that the President would make a communication to Dublin Castle before that date notifying that he was duly qualified to hold the office.

The President said that the inspectors of lunatic asylums had taken up an untenable attitude in this matter. Mr. Gilbert called on him before he wrote his first letter, and he (the President) gave him a letter to Dr. Hatchell, in which he called attention to the 34th section of the Pharmacy Act. That section was perfectly clear, and no matter what opinion the inspectors might hold as to the advisability of having an apothecary instead of a pharmaceutical chemist, the regulations of the Privy Council made prior to the Pharmacy Act of 1875 could not override its provisions. He had been told by Mr. Gilbert that the local governors of the institution were in favour of appointing him. He had only his word for that; but he told him that if they should appoint him the inspectors of lunatic asylums at the Castle would have to confirm the appointment. This gentleman had been acting as the qualified manager of an establishment, the late proprietor of which had actually filled the post for which he was now declared to be ineligible. He had appealed to the Council, and it was their duty not to lose a moment in pressing upon both the local governors of the asylum in question, and the inspectors of lunatic asylums, that he was fully qualified by Act of Parliament to hold the position in question.

Mr. Doran: Mr. Gilbert was with me for some years, and he is a thoroughly reliable and efficient dispenser, and I cannot understand on what principle they refuse to give him the appointment.

The President: They say that the duties of the office are such as to require an apothecary.

Mr. Wells: There is more than one doctor connected with the asylum in question, and therefore only a remote probability that all will be away at the same time.

The President: The only thing we have before us is that our licentiates are qualified by law to hold these appointments.

Professor Tichborne: Has the gentleman to visit patients at night?

The President: No, that is not his duty. The regulations say that the "duty of the apothecary if resident shall be to devote his services in the asylum to assisting the medical officers; and if non-resident he shall attend daily at the asylum before two o'clock, or whenever required by the resident medical superintendent; he shall compound all prescriptions, enter them in a book, and inscribe directions on each parcel, and take care that all medicines not used or counter-ordered shall be returned to him; he shall assist in the infirmary or in any other part of the Association where his services are needed; but he shall not prescribe for patients except on urgent occasions, or in the absence of the resident or visiting physician." That regulation was made by the Privy Council the year before section 34 of the Pharmacy Act, 1875, became law, and the Act of Parliament quite overrides it.

Mr. Hayes moved the following resolution:—

"That communications be addressed to the inspectors of lunacy, and also to the governors of the Ennis Lunatic Asylum, calling their attention to the Pharmacy Act, in which it is enacted that a licentiate of the Pharmaceutical Society of Ireland shall be qualified to hold the office of apothecary in any district lunatic asylum or county jail or prison in Ireland."

Mr. Charles Evans seconded the above, which was carried unanimously.

Donations were announced from the Pharmacy Board of Victoria of a copy of their Register for 1888, and from the American Pharmaceutical Association of a copy of their 'Proceeedings' for 1888.

It was ordered that the donations be acknowledged with thanks.

Professor Tichborne moved pursuant to notice the following resolution:—

"That it is the opinion of the Council that no important part of the proceedings of the Society shall be omitted from the official reports except by an order of the Council which has been carried by a majority of the said Council."

He brought this motion forward in connection with a transaction that took place relating to the January meeting of the Council; but he did so with no feeling of disrespect to the President, for they all admired his general cleverness and all that sort of thing, but really as a matter of principle. The question involved was whether one member of the Council was to rule the Council and suppress any portion of their proceedings. There were two reasons why he protested against such a false position. One was that a suppression of the kind prevented the members of the Society generally from knowing what the action of the members of the Council was in relation to the matter excluded. It prevented the members generally from knowing what took place at the Council. That was radically wrong. Another objection was that it instituted a one-man policy. However clever that one man might be, his opinion was not the opinion of the Society. The action of the Council was supposed to represent the collective wisdom of the Society. But if a one-man policy were put before the public it would not represent either the collective wisdom of the Council or any diversities of opinion that might occur in it. Personally he had been on one or two occasions the victim of these suppressions; but his feeling was that if he was mistaken in any of his views his mistake should appear before the members. Let them all be judged according to the merits of their views. He dared say he had been very often wrong, and so had others. He did not speak as an inexperienced member. He sat under the presidency of Sir Dominic Corrigan for a good many years, and he was afterwards President himself, and they never found that any suppression of the proceedings of the Council was necessary (question). No doubt a resolution was

passed that law matters should be only briefly noticed. Those were the only things in either Sir Dominic Corrigan's or his own experience as President of the Association, in which there was any suppression, except on two occasions, on one of which he modified a word on his own responsibility, not being able to consult the speaker, who was afterwards very much obliged to him for it; and in that case he did not alter the sense of what took place. The particular matter to which his present motion referred was this. A notice of motion, which was evidently carefully considered, was put by the President on the paper, to the effect that from the 1st of February in the present year the supply of the *Pharmaceutical Journal* to the members of the Society be discontinued. Thinking that it would pass, the President also drafted a letter expressing thanks to the President and Council of the Pharmaceutical Society of Great Britain for their kindness; and he further put a notice on the agenda paper that a committee should be appointed to consider the subject of the reporting of the proceedings of the Society. When the notices came on at the January meeting of the Council, there was considerable discussion on that for the discontinuance of the Journal, and no objection was made to it until he (Professor Tichborne) got up and objected. He expressed doubt as to whether any saving would be effected by the proposal, and pointed out that the Council had undertaken in October last to supply the members with the *Pharmaceutical Journal* for twelve months, and were therefore under an obligation to do so. On that legal ground the President withdrew his motion. Now he (Professor Tichborne) wanted to know, and asked the President to explain, why he suppressed the whole of that discussion from that report. It was a subject that concerned all the members, and next to the Pharmaceutical Bill had been for years the most specially interesting to them. The course taken was a great want of respect, and a bad compliment to the intelligence of the other members of the Council, and he (Professor Tichborne) individually protested against it. Of course, if the Council liked to have their proceedings regulated in such a way he had no objection. He therefore moved his resolution. Of course they did not want to make petty objections about the omission of small matters; but where there was an important subject the members were entitled to have it reported. He might as well tell them that this was a subject of great interest to the country members. He had got a letter from Dr. Whitla which he would read.

The President: I think the place for a member of the Council to express his opinion in is the Council chamber.

Professor Tichborne: I am not going to read his opinions, I only want to point out that the subject has excited considerable interest.

The President: Really, Mr. Tichborne, I have already ruled that the letter is not to be read.

Professor Tichborne:—I was not going to read it. I only wanted to quote so much as would show the interest the writer takes in the subject.

Mr. Merrin seconded the resolution of Professor Tichborne. He thought the members should be made aware of important discussions, especially such as that relating to the supply of the Journal.

Mr. Hayes said it was a great pity that this matter had been brought forward, and he feared that it was not done in a good spirit towards the President. They all had most unqualified confidence in Mr. Brunker; and feeling that he was loyal to the Society and to its members he (Mr. Hayes) would no nothing that would bring any discredit either on him or his office, or on the Society.

Professor Tichborne: I rise to order. That is not the question raised. The question raised is,—is it desirable that the President shall have the power of suppressing a part of the proceedings?

The President ruled that Mr. Hayes was speaking to the question.

Mr. Hayes said they had the fullest confidence that Mr. Brunker would do everything that was right in connection with the reports of their proceedings that were to be laid before the Society and the public. Many things were discussed there that it would be most injurious to the interests of the Society to lay before the public. They might be misinterpreted, and the publication of them might cause an amount of mischief that could not afterwards be remedied. That was so in the case of the Bill that was last year before them, and also in the case of the special subject to which Professor Tichborne alluded. Professor Tichborne suggested—and it was considered to be a good suggestion—that the Council should not break faith with the members who had paid their subscriptions, but should continue to supply them with the *Pharmaceutical Journal* to the end of the year. It was on that ground, and on that alone, that the withdrawal of the notice from the members without a division was conceded. He (Mr. Hayes) thought that the President was quite right in suppressing that discussion, for this reason, that they did not want to show their friends in England, who had been good friends to them, that they contemplated treating them in any way that would show want of appreciation of what they had done for them; and also because they found that the time was not exactly ripe for carrying out what was contemplated, and that it would be much better to have the matter thoroughly ventilated next October. Therefore he thought that the President acted with great discretion in withdrawing the subject from publication in the Journal. He thought that every member of the Council, or at all events a large majority of them—he should say eighteen out of the twenty or twenty-one—would have the most perfect confidence that the President would do nothing in any way discreditable to himself, his office, or the Society.

Mr. Grindley in supporting Mr. Hayes said he desired to call attention to the fact that up to 1881 the reports of the proceedings of the Council and Society were very meagre. At the annual meeting that year, Professor Tichborne being President, a resolution was brought forward that a paid reporter should be appointed in order that the members of the Society might have more information respecting the proceedings of the Council than they had previously had. That resolution was carried with an addendum proposed by Professor Tichborne, that all the reports that should be made by the reporter to be appointed should be subject to revision by the President. The matter was brought up at the next meeting of the Council, Professor Tichborne being again in the chair, and the motion was then passed with the addendum that all the reports should be supervised by the President. Since that time, and during Professor Tichborne's tenure of the chair, he did exactly as had been done since he left the chair. The reports were sent to him for correction or supervision, and they were supervised by him; and he (Mr. Grindley) was quite sure that anything that was derogatory or dangerous to the Society or that occurred out of course in the heat of debate was omitted from the reports. The rule was also acted on during the presidency of Mr. Allen; and he (Mr. Grindley) was quite sure that he would be endorsed by all the members present, when he said that their worthy President who filled the chair now had only acted as his predecessors had done. Therefore he (Mr. Grindley) had great pleasure in supporting Mr. Hayes in this matter.

Mr. Allen said that personally he looked on this motion—whether intentionally or unintentionally so—as nothing but an insult to the President. He could not see that he had done anything that he should not have done. He had corrected the report in

question in the way that would have been done if it had been put to the meeting. When anything private came before that Council in Committee it should not be published. But he was sorry to say that at a general committee meeting there they went into a notice of motion of Professor Tichborne, in relation to the Pharmacy Bill, and the matter discussed was supposed to remain secret; but that very evening, in London, the information—where it came from he was not prepared to say, but suspicion pointed in a certain direction—the information that should have remained private——

Professor Tichborne: I rise to order. If the gentleman refers to me I say the statement is unfounded and an untruth.

Mr. Allen: I do not know where it came from.

Professor Tichborne: You said it pointed——

Mr. Allen: To some member of the Council. I am not able to indicate.

Professor Tichborne: A member of the Council has no right to make insinuations.

Mr. Allen: Professor Tichborne will be able to reply.

Professor Tichborne: I call on the President to rule that Mr. Allen is out of order. He has made an insinuation against me and against the Council. I deny it emphatically. It is not the truth.

Mr. Allen: I have not mentioned anyone's name.

Professor Tichborne: Well, sir, it was next door to it, and I call on you to withdraw it as regards its application to me.

Mr. Allen: If it refers to you I withdraw it, but I say it went through some member of the Council, I am not prepared to say whom.

Professor Tichborne: Is it withdrawn as regards me?

Mr. Allen: I have great pleasure in withdrawing it.

Mr. Wells said he could not give a silent vote in this matter. He had been always anxious that the reports should be as long as possible in order that they should give as much information as possible to the licentiates. The reports were now very much improved in every way from what they were. Sometimes, perhaps, some of them made speeches that they would like to see more fully reported than they were; but if everything that was said by members were to be reported fully, perhaps they would want the whole Journal to themselves.

The President said that before putting the motion he thought a few words were called for from him. Notice of this motion was given for the last meeting of the Council. Unfortunately he was obliged to be absent on that occasion, and he wrote to Mr. Tichborne saying that as the motion amounted to a vote of censure on him he asked him to postpone it until he could be present. Mr. Tichborne by implication accepted that interpretation that the motion was intended as a vote of censure on him, and had still further emphasized it by the remarks that he had made in support of the motion. As it appeared on the notice paper it was very much to the same purport as a notice given for the last annual meeting, and which at a large meeting of the Society did not succeed in getting a seconder. The motion censured what was done by Mr. Tichborne when he was President—by him (Mr. Brunker) when he was formerly President—and by Mr. Allen, such being the course he had always adopted in looking over the reports supplied to him by Mr. Macartney. Nothing of importance was omitted from them. The alterations that he had made were few and far between; and until Mr. Tichborne's remarks to-day he was at a loss to know what was the occasion which gave rise to the present motion. At the January meeting the second or third speaker on his motion was Mr. Tichborne, who raised the legal point that the members having paid their subscriptions for the year were entitled to get the *Pharmaceutical Journal*. That being a point which upset the whole principle of the proposition which he intended to make, he withdrew his motion. But no report of it was made by Mr. Macartney, and therefore he (the President) struck out nothing. In the copy that he got from Mr. Macartney there was not the slightest reference to the motion. Anyone who looked at the reports in the two journals would see that they were the same, except that occasionally the *Chemist and Druggist* did not afford them quite so much space as the *Pharmaceutical Journal*. Under the circumstances he (the President) could only look on this motion as a vote of personal censure on himself. If their President was not to be entrusted with the duty of revising the reports and excluding from them any matter that might be injurious to the Society, he was not worthy to sit in the chair; and if they could not have a President to whom they could entrust that duty, the sooner the Council shut up the better.

Mr. Macartney, the reporter to the Council, explained that on the withdrawal of the motion he asked the President whether the discussion on it was to be reported, and the President said that it was not. Consequently, he (Mr. Macartney) did not transcribe the notes he had taken of it.

Professor Tichborne, in reply, said he had nothing to add. As regarded the present motion being a vote of censure on the President he (Professor Tichborne) could not see how his having acceded to the request for a postponement was an admission of that.

The President: Excuse me, I said nothing of the sort. You have the wrong end of it. I wrote to you saying that I regarded the notice as a vote of censure; you never repudiated that construction and therefore accepted it.

Professor Tichborne said that no one had a greater respect for Mr. Brunker than he had; but he often differed very much from gentlemen for whom he had a very great respect. Therefore he must deny that he had brought forward the present motion out of personal disrespect to the President. There was a clear distinction between important discussions at the Council and proceedings in committee, which should not be reported.

The President then put the motion, which was negatived by 8 votes to 3.

The Council divided as follows:—

For the motion—Professor Tichborne, Messrs. Merrin and Simpson.

Against it—The President, Vice-President, Messrs. Doran, Charles Evans, Hayes, Allen, Hodgson and Wells.

The President: Gentlemen, I am very much obliged to you for the confidence you have shown in me by rejecting this motion. I must say that I considered it nothing else than a vote of want of confidence. Had the motion been supported by any considerable minority I should have had—as is said in another place—to consider my position. I never committed any breach of confidence yet, and as long as I remain in this chair I never shall.

Mr. Hodgson moved, pursuant to notice—

"That the question of providing premises for the Society be taken into consideration."

As they were aware notice had been given of surrender at the end of six months of the premises in which they at present were, and the point on which he now asked them to express an opinion was, would they take a house again by the year and go to the expense again of preparing it for their purposes, or look out for a house which would be suitable for their purposes and purchase it.

Mr. Hayes said they were scarcely in a position to lay out much money.

The Vice-President observed that they were at present under a rent of £50 a year.

Professor Tichborne said the best course was to refer the subject to a small Committee.

On the motion of Mr. Wells, seconded by Mr. Grindley, a Committee, consisting of the President, the Vice-President, Mr. Hodgson and Mr. Hayes were appointed to look out for a suitable house, and report to the next meeting of the Council.

Mr. Hayes moved that the question of the introduction of a Pharmacy Bill in the present session of Parliament be taken into consideration. He believed that if they went forward with a Bill this year they would not be alone.

The President remarked that the great thing would be to start early in the session.

In reply to Professor Tichborne the Registrar stated that the total cost of last year's Bill was £155.

The matter was referred to Committee.

Reports from the Examinations Improvement Committee and the Law Committee were considered and adopted.

On the motion of the Treasurer, Mr. Hodgson, seconded by Mr. Beggs, Dr. Patrick Walsh, L.P.S.I., of the Medical Hall, Mitchellstown, was admitted a member of the Society.

Some financial business having been disposed of, the Council adjourned.

Provincial Transactions.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The seventh meeting of the eleventh session was held in the Pharmaceutical Society's House, 36, York Place, on the evening of Wednesday, February 20, at 9.15, Mr. George Coull, President, in the chair.

The minutes of last meeting having been read and adopted, the following communications were read :—

Easton's Syrup.

BY J. G. WILSON.

Easton's Syrup having been included in the B.P.C. Formulary I thought it might be interesting to bring under your notice an analysis of a few samples obtained from various sources. As you will be aware the B.P.C. formula contains only ¾ grain quinine phosphate in each fluid drachm, whereas the original formula contained 1 grain. Quinine phosphate is now used also in place of the old process of precipitating the alkaloid from the sulphate, washing and dissolving in phosphoric acid. These changes are both improvements. It was found that 1 grain quinine phosphate per drachm would not remain in solution and, as shown by Mr. Gilmour, as much as ten per cent. of alkaloid was lost in the process of precipitating and washing the alkaloid.

I examined five samples in all. The alkaloids were estimated by adding citric acid to keep iron in solution, rendering alkaline and washing out the precipitated alkaloids with chloroform. The chloroformic solution was evaporated, the residue dried at 110°. C., and the total alkaloid weighed. The alkaloids were then dissolved in hydrochloric acid and the strychnine precipitated by addition of potassium sulphocyanide and weighed; the percentage of quinine being found by difference. This was found to be the most satisfactory method. The iron was precipitated as sulphide, oxidized with potassium chlorate and weighed as ferric oxide, the results being stated as ferrous phosphate. The phosphoric acid was estimated by precipitating all bases with an alkali, adding ammonio-magnesium sulphate, washing, drying, and igniting and weighing the pyrophosphate of magnesium and calculating the acid therefrom.

The results were as follows :—

Quinine Phosphate per fluid ounce.		Strychnine per fluid ounce.	Ferrous Phosphate per fluid ounce.	Phosphoric acid per fluid ounce.
B.P.C. standard.	6·0 grs.	·25 grain.	8 0 grains.	50 grains.
A . .	5·75	·25	7·1	47
B . .	5·75	·25	7·5	45
C . .	5·25	.25	6·4	48
D . .	4·25	·20	5·0	31
E . .	2·0	·10	5·0	26

It may be noted that though the B.P.C. formulary gives 8 grains per ounce of ferrous phosphate as the standard practically you cannot have more than 7·7 grains. The Committee seem to have assumed that there are 20 ounces of the syrup. ferri phosph. in 20 ounces of Easton's Syrup, whereas there are only 19 ounces and 2 fluid drachms. This seems a suitable place in which to have inserted the elastic word "about."

Of the above samples A and B are very satisfactory. C is deficient in iron and slightly in quinine, the latter having probably been added by the old process of precipitation from the sulphate, and not by directly dissolving the phosphate. D shows an all round deficiency, while E is a very bad sample and is quite perceptibly less bitter than the others. It is noteworthy that it was also the cheapest sample of the lot, thus giving another illustration of the general truth that cheapness and inferior quality go hand in hand. I may mention that an analysis of a sample made by myself in accordance with the B.P.C. formula gave practically the same results as B, except that I found 49 grains per ounce of free phosphoric acid. Both A and B contained hydrochloric acid, added, probably, to keep the quinine in sulution.

Mr. Fraser McDiarmid, in some notes on the B.P.C. Formulary, states that this preparation after standing a month in a cold place deposits crystals of quinine phosphate, and after two months is almost solid. Mr. P. MacEwan, in a paper read this year before the London Association, throws doubt on this statement, and says that in the deposits he has examined he found no trace of quinine. He further states that quinine salts, once in acid solution, are not such tender things as to change their character and become insoluble by mere exposure to atmospheric influence. As I have seen the deposit frequently in the syrup I filtered it out and examined it. After being carefully washed it gave a bulky precipitate with Mayer's reagent, the green thalleioquin test with chlorine, and the iodo-sulphate test with iodine, thus clearly proving the presence of quinine. I also found ferric phosphate in the deposit. Mr. R. A. Cripps has also recently shown that crystals of quinine salt separate from the syrup of hydrobromate of quinine, and Mr. Stark has exhibited crystals which had deposited from a strong acid solution of quinine sulphate. These two facts tend further to demolish Mr. MacEwan's theory as to the invulnerability of quinine salts in acid solution.

Mr. W. L. Howie, in his paper on the "Phosphates," mentions the precipitate of quinine phosphate. His method to remedy the defect was to facilitate the crystallizing out of the quinine by exposure to a low temperature, then filter through calico; dissolve the pasty mass in water, add citric acid to keep iron in solution, precipitate the alkaloid with ammonia, redissolve it in phosphoric acid, and add the solution to the syrup, which in the meantime should have been filtered. This method has two fatal objections; it does not prevent crystallization of the quinine salt, and it colours the syrup. I do not think the B.P.C. formula can very well be improved upon, but where

large quantities are made at a time the keeping qualities of the syrup may be improved by the addition of 2 drachms to the pint of diluted hydrochloric acid.

Tincture of Opium.

BY J. HENRY HOSEASON.

This tincture is usually prepared by retail chemists themselves. Its extensive use as a domestic remedy gives it a foremost place amongst our popular medicines. It is very simply made, and the official directions are clear and concise. For these reasons I thought it would be interesting to discover to what extent ordinary commercial samples come up to the standard required. For this purpose I obtained and examined ten samples from different sources.

The Pharmacopœia directs powdered opium to be used, and therefore it must be understood that dried opium is intended. In practice I believe it is very common to use ordinary moist lump opium, and that, too, without making any allowance for the amount of moisture contained in it. This of course is incorrect, for unless the sample of opium is richer in alkaloid than the Pharmacopœia permits, the resulting tincture must be under the official standard of 3·3 grains morphine in 1 fluid ounce. That such tinctures are made is evident on an inspection of the table I have drawn up, notably samples 4, 5 and 7. Moist opium usually contains about 13 per cent. of water, and if it is used 14 parts should be substituted for every 12 parts of the powdered opium ordered. Thinking that all the morphine would not be extracted by the ordinary maceration process I estimated two samples of the marc left, and found 1 per cent. morphine in the one and 0·5 per cent. in the other. This explains the fact that morphine manufacturers pay a good price for tincture of opium marc. Some chemists even make "Bow's liniment" from the marc and sell the marc from the liniment. This is a good illustration of the utilization of waste products.

The old Edinburgh Pharmacopœia process of boiling the opium with the water, adding the spirit, and macerating for thirty-six hours and filtering, gives a very good tincture, and the resulting marc contains only a mere trace of morphine. In practice very often the opium is merely broken into small pieces, allowed to macerate for seven days and then filtered off. If some of these pieces of marc be split up the centre is seen to be quite unacted on.

According to the Pharmacopœia a good opium should yield 50 per cent of extract; thus from the 33 grains of opium in the ounce of tincture we should get 16·5 grains of extract and somewhat less of dry residue. This, however, is under the mark, for Umney and others have proved it to yield frequently over 60 per cent. The average of dry residue from ten samples was 16·4 grains per ounce, and the average soft extract about 19 grains per ounce, thus confirming the result obtained by Umney. Each sample was examined as to its specific gravity, alcoholic strength, extractive and morphine, and the following table shows the result.

Forty per cent. of the samples were evidently made with proof spirit and 60 per cent. apparently with a mixture of equal parts rectified spirit and water. The best tincture is said to be got by using equal parts spirit and water, and this method is largely adopted by chemists, but the quality of the opium is of much more importance than the solvent. Fifty per cent. were above the average in extractive and morphine and 50 per cent. below. A great variation will be noticed in the quantities of extract of morphine obtained from the samples, an ounce of No. 3 being equal to 1½ ounce of No. 8 tincture as regards extract, and to 2½ ounces of Nos. 4, 5, and 7 in morphine. No. 3 is a good tincture, but has the objection of being fully 50 per cent. too strong in morphine.

	Specific gravity.	Absolute alcohol per cent. by weight.	Grains residue per fluid ounce.	Grain morphine per fluid ounce.
1. . . .	·964	38	18·5	3·5
2. . . .	·952	40	17·0	3·0
3. . . .	·942	41	20·5	5·0
4. . . .	·940	42	14·5	2·0
5. . . .	·962	36	15·3	2·0
6. . . .	·960	37	17·3	3·0
7. . . .	·961	37	15·0	2·0
8. . . .	·966	35	13·5	2·5
9. . . .	·961	38	14·6	2·7
10. . . .	·946	40	18·0	3·0
Average—.	·955	38·4	16·4	2·8

Woodland, in a paper read before the Pharmaceutical Conference ('Year-Book,' 1882), found the average of fourteen samples of tincture of opium to be extractive 3·53 per cent., and morphine ·53 per cent. My averages are 3·49 of the former and ·61 of the latter.

I would suggest that tincture of opium might be made from the standardized extract in the same way as tincture of nux vomica. This may be done by dissolving ¾ ounce of extract in the water, adding the requisite quantity of spirit, allowing to stand twelve hours and filtering. This forms a good dark coloured tincture. A curious fact came to light while calculating the respective costs of tinctures prepared by the official process and from the extract. Good dry opium costs about 1*s.* per ounce, and the tincture made from it cost 3*s.* 4*d.* per pint. Extract of opium costs 1*s.* 8*d.* per ounce, and tincture made from it 3*s.* 1*d.* per pint. Thus the wholesale houses appear to have the trouble of making the extract, and yet sell it at a cheaper price than the crude opium from which it was obtained.

Another method for making the tincture is to make a strong liquor from the crude opium, estimate the morphine in this, and dilute it with the proper quantity of menstruum to form a tincture of the standard strength. By adopting either of these means the tincture would be less liable to the variations at present prevailing.

The difference in colour of the various samples was very marked. I am told that exposure to sunlight rapidly deepens the colour of fluid preparations of opium, and an experiment with the tincture confirmed this. Another point deserving comment is the fact that out of nine cases in which a 2 oz. bottle of laudanum was asked for, four supplied only a 1½ ounce bottle.

The report on the botanical excursions of last summer which gained the prize offered by Mr. Gowden was read by the author, Mr. Thomas Conley.

Note on Extracts.

BY C. A. MACPHERSON.

The author having referred to the importance of reaching, as far as possible, definiteness and uniformity in official processes, and pointed out this as offering a wide field for investigation to earnest workers, proceeded to illustrate the points by reference to the official extracts.

Of the forty-seven extracts in the British Pharmacopœia nineteen are directed to be evaporated till they are of a suitable consistence for forming pills, five till they have acquired a suitable consistence, and four to the condition of a soft extract. Judging from the varying conditions in which extracts are supplied by dealers it would seem as if makers interpreted these three phrases in widely different ways. Thus it seems as if the first were at times taken to mean a consistence suitable for assisting to form other sub-

stances into pills, instead of, as it is really intended to be, a pilular consistence, while the other two are taken to mean anything, from the consistence of treacle to that of newly-baked bread.

Among the liquid extracts that of bael is evidently intended to measure 16 fluid ounces, but in the directions nothing is said about making up the measure with distilled water, as is done in other instances. The erratic and reckless manner, "regardless of cost," in which the directions are framed when spirit is used is most remarkable. There are nineteen extracts in the preparation of which large quantities of spirit are employed. In six of these the whole of the spirit, and in two all of, all except a small reserved portion, is to be wasted or "evaporated," while in one, three-fourths of it, and in another one-half, is to be similarly treated; in five it is to be recovered by distillation, and in four the greater part is to be distilled off. In three cases ether is used, in one case it is to be wasted or rejected, in another it is to be partly recovered by distillation, and in a third it may either be evaporated or recovered at pleasure. It is useless to speculate as to why these different directions have been given, as the reason seems inscrutable. That the subject is surrounded with difficulties is not denied, but difficulties exist only to be overcome, and there is no reason why with patient study and intelligent investigation processes should not be devised which shall yield preparations less liable to variation than those at present official.

Note on Bismuth Citrate.

BY DONALD MCEWAN.

The following is a reply to the query read at last meeting as to the official test for bismuth citrate.

The B.P. says, "On strongly heating citrate of bismuth it chars, and on ignition yields a residue for the most part black, but with a yellow surface." The querist had observed the formation of metallic globules while testing the citrate in the flame, and threw doubts on the accuracy of the official description of the residue left on ignition. On trying a larger quantity in a crucible I found the same result, and from my observations I conclude that the free carbon at first formed deoxidizes the bismuth oxide, Bi_2O_3, and reduces it to the metallic state. Metallic bismuth, as is well known, oxidizes at a red heat, and so the final result is a mixture of the metal and bismuth oxide, as you may see from the two crucibles I have placed on the table. In one the proportion of oxide is very small. The ignition in this case was done at a bright red heat, and so was over quickly. In the other a low heat only was used, and consequently a longer time for oxidation was allowed. The result in neither case can be accurately called black or blackish. It might be called grey, but I think the best description would be to say that it consists of metallic bismuth with a yellow coating of oxide. I have to thank Mr. Duncan, Royal Dispensary, for permission to conduct these experiments in his laboratory.

Note on Glycerinum Acidi Gallici.

BY G. MELVIN.

A short time ago I had occasion to dispense the following mixture:—

℞ Glycerin. acid. gallic.	℥i.
Acid. sulph. dil.	♏ii.
Ext. ergotæ liq.	℥ss.
Aq. cinnamomi . . . . . ad	℥viii.

Misce.

It was sent out a perfectly bright mixture, but was returned a few hours afterwards with a message that some mistake must have been made. The gallic acid had separated in bundles of large acicular crystals. It was stated that the mixture had been previously dispensed at different pharmacies and had never shown the same separation of crystals before. The mixture was again dispensed with a precisely similar result, and to obviate the difficulty an additional halfounce of glycerine was added to it and sufficed to keep the acid in solution. The glycerin. acid. gallic. used had been very recently prepared and was of a very faintly brownish tint.

I obtained samples of glycerin. acid. gallic. from different pharmacies and treated them as follows:— To 4 drachms of each sample I added 4 ounces of distilled water, and exposed the mixture to a temperature of 32° F. Even after the lapse of two or three hours no crystallization had taken place. Repeating the experiment with various samples of glycerin. acid. gallic., which I had recently prepared from different samples of gallic acid, crystallization began almost immediately. All these samples were made with only just sufficient heat to dissolve the gallic acid by placing them in a water-bath. A portion of a freshly prepared sample of glycerin. acid. gallic. was heated to 340° F. for about 5 minutes. Bubbles of carbon dioxide were given off, and the gallic acid was evidently changing into pyrogallol. On using this overheated sample to make the mixture there was only a very slight separation of crystals even after exposure to a temperature of 20° F. This I account for by the partial change of the gallic acid into pyrogallol, which is freely soluble in water. I think it is probable that a change similar to that produced by overheating takes place in this preparation after long keeping, and that this accounts for the fact that separation of crystals only took place when freshly prepared samples were used. It is, of course, possible that too great heat was used in making some of the commercial samples I obtained.

I observe Squire states that in the case of glycerin. acid. gallic. part of the acid separates on cooling and remains undissolved. This, however, I cannot confirm. I have prepared various samples from different acids, and glycerine of B.P. specific gravity, using as low a heat as possible to effect solution, and even at a temperature below freezing no separation took place. It is, however, a saturated solution, and if made stronger the acid is sure to crystallize.

Impurity in Citric Acid.

BY G. MELVIN.

This impurity was met with while preparing a large quantity of solution of potassium citrate from potassium carbonate and citric acid. The potassium carbonate was dissolved in water, and on adding the citric acid slowly I was surprised to find a number of metallic particles in the bottom of the vessel containing the solution. On collecting and testing these they were found to be metallic lead.

In the United States Dispensatory it is stated that metallic lead is sometimes present, due to small particles being rubbed off when removing the crystals from the crystallizing vats.

There can be little doubt that this explains its presence in the sample I refer to. It can hardly be regarded as safe or allowable to have such an impurity in an acid which is guaranteed to be chemically pure.

The Pharmacopœia gives a test for the detection of lead, namely darkening of an aqueous solution of the acid by sulphuretted hydrogen. This test, however, is only fitted to detect lead when present in a soluble form. Should a sample such as the one I met with be employed in the manufacture of such preparations as effervescing citrate of magnesia the metallic particles would very probably be swallowed and might give rise to unpleasant consequences. In view of the fact that such contamination is apparently not uncommon it might be well to add to the official tests a statement that it should be free from metallic particles.

Note on a Sample of Euonymin.

BY A. RUSSELL BENNET.

Mr. Bennet stated that a preliminary examination showed that this sample of green euonymin contained 50 per cent. of lycopodium. This probably accounted also for the presence of fixed oil, which caused the sample to give an oily stain to the paper in which it had been wrapped. The colouring matter was of a deep bluish-green tint, and was soluble in alcohol, ether, chloroform, benzol, petroleum ether, amylic alcohol and carbon bisulphide. It looked like chlorophyll, but he could not yet say definitely what it was. The sample yielded only 2 per cent. of ash consisting of lime with a trace of iron.

The reading of the papers was followed by a discussion taken part in by Messrs. Bennet, Coull, Duncan, Hill, Hoseason, Lunan, McCurrie, Macdonald, McEwan, Macpherson, Merson and Wilson, and on the motion of the Chairman a cordial vote of thanks was awarded to the authors.

The meeting then closed.

ABERDEEN AND NORTH OF SCOTLAND SOCIETY OF CHEMISTS AND DRUGGISTS.

In accordance with the resolution which was passed at the Jubilee celebration in the Palace Hotel on the 20th ult., the assistants and apprentices were invited to a dance in the Music Hall Building on the evening of Tuesday, March 5. The success of the gathering is mainly due to the indefatigable exertions of Dr. Presslie and Mr. John Cruickshank and a few of the assistants, who have worked with a will which has overcome all obstacles and stamped the gathering a grand success.

At the hour of meeting (9 p.m.) those who had signified their intention of being present were thronging in, and after taking up their places in the ball room, presented a most brilliant appearance. After a spell of an hour and a half a breathing halt was called, during which Ex-Bailie Paterson, Treasurer of the Society, addressed the gathering.

After a few introductory remarks, Mr. Paterson said that in proposing to celebrate the jubilee of the Association the members felt that it would not be complete unless they invited the assistants and their lady friends to enjoy themselves on the auspicious occasion, and they were very glad indeed that they had turned out in such numbers. In looking back over the fifty years the Society had been in existence, he might safely say that it had been of great advantage to the assistants in Aberdeen. It was originally started in order to provide them with the means of education, both by providing a library and also other means of instruction, and while it had all along kept that purpose in view it had served another purpose amongst the trade in Aberdeen. It had kept up a spirit of brotherhood and goodwill and good fellowship which had been most apparent in the city, and which was envied by their friends in the south, where they all existed as units without having any intercourse with each other, and without possessing any means of knowing each other. In this respect their Society had not been unmindful of the original purpose for which it had been called into existence, and had done as much as in it lay to promote the education of the assistants and to put within their reach the means of providing for themselves, which they considered a better help than anything else they could attempt for them. They felt, however, that they had been rewarded by the fact that the students of Aberdeen had taken very high places in all the examinations they had to pass. Indeed, so much so had that been the case that Mr. Gilmour, who came down the other day from the Pharmaceutical Society, told him that when any of the examiners sent down by the Privy Council saw a particularly bright student present, they invariably inquired if he came from Aberdeen. That showed them that they had a character to maintain, and he would like them to remember that Aberdeen students were marked men; and that it devolved upon those present to keep up the high reputation which Aberdeen students had attained. The trade had changed in many respects during the past fifty years—changed in many respects for the better, and changed in many respects in a sense which made it much harder to get a living out of it; but there were always difficulties to be encountered, and the only thing for them to do was to put "a stout heart to a stey brae." There was a large field before them, and he hoped they would take advantage of the rooms provided for them in Bridge Street. In behalf of the Society he welcomed them to the Jubilee celebration, and hoped that they would look back to that night with pleasure. He would like them to take the fact of their being there as a token of the goodwill of the masters towards them, and of a desire on their part for their welfare.

A hearty vote of thanks was awarded ex-Baillie Paterson for his kindly remarks, and dancing was resumed, and kept up with great zest to the stirring strains of Mr. Sharp's band till 3 a.m.; the M.C.'s (Messrs. J. Strachan and A. Royal) ably performing their duties.

Amusements of various characters, such as bagatelle, chess, draughts, shooting, etc., were provided for those who were not continuous frequenters of the ball room, and Mr. W. Reid, Holburn Street, gave a most interesting magic lantern exhibition. A number of songs were also contributed during the evening by ladies and gentlemen in the company.

The commissariat department was entrusted to Councillor Wood, who purveyed with much acceptance.

The Secretary (Mr. A. Strachan) has since received the following letter:—

"9th March, 1889.

"Dear Sir,—At a meeting of the Aberdeen Chemists' Assistants' and Apprentices held in the Rooms, 21, Bridge Street, last night, I was instructed to send you a copy of the following resolution, which was moved by Mr. J. C. Barclay, seconded by Mr. C. Hunter, and unanimously agreed to:—That this meeting thanks the members of the Aberdeen and North of Scotland Society of Chemists and Druggists most sincerely for the entertainment so generously given and successfully carried out; and further takes this opportunity to congratulate the Society on the occasion of its first Jubilee and wishes it a continuance of its past prosperity. I am, Yours, etc.,

"C. Hunter."

GLASGOW CHEMISTS' AND DRUGGISTS' ASSOCIATION.

Assistants' Section.

The fifth meeting of the session took place on Thursday, 7th inst., in the Religious Institution Rooms, 177, Buchanan Street, when Mr. Bowie, of the Glasgow Apothecaries Company, read a paper on "Some Peculiarities of Plant Life."

The essay was mainly an account of observations made by the author in the neighbourhood of St Rollox, and on the upper reaches of the Molendinar, a tributary of the river Clyde, from the banks of which he had collected many abnormal varieties of typical forms.

A selection of the most interesting of these was exhibited in the course of the evening, and attracted great attention.

Proceedings of Societies in London.

ROYAL INSTITUTION.

The Discharge of a Leyden Jar.

A lecture was given on Friday the 8th inst., by Professor Lodge, on the discharge of a Leyden jar. The lecturer remarked to begin with that all charges of electricity were virtually the same as those of a Leyden jar, for there could not exist a positive charge without a corresponding negative charge somewhere, any more than one end of a piece of string could be conceived of without the other end, which might be hidden or split up into strands but must exist somewhere. The charged jar covers the field of static electricity, and its discharge that of currents ; as the discharge magnetizes by induction the surrounding objects the field of magnetism is invaded, while, inasmuch as light is a form of electric vibration, the domain of optics is also encroached on. The Leyden jar was compared to an endless cord passing over pulleys and kept in a given position by elastic bands: charging the jar was analogous to pulling the cord round and stretching the bands, the tension in the bands representing the potential of the jar. On releasing the cord it would fly back again, but its inertia would cause it to overshoot the mark, and there would be several oscillations before equilibrium was restored. Similarly the discharge of a Leyden jar was of a like oscillatory character, only the oscillations were of course enormously rapid; their rapidity was calculated in 1853 by Sir William Thompson. Helmholtz, however, had succeeded in proving this by catching a jar in the act of being discharged with its charge reversed. Just as the vibrations of a spring are diminished in rapidity with the lengthening of the spring, or by loading its end, so in the Leyden jar the velocity of the oscillations can be diminished by increasing the capacity of the jar (which corresponds to lengthening the spring) or by increasing the inertia, that is to say, the self-induction, which is electro-motive inertia. This self-induction or inertia is due to the magnetization of the space surrounding the current, and can obviously be increased by lengthening the wire through which the discharge takes place. By using both these means, that is, by using a large number of jars connected in battery so as to increase the capacity, and by introducing a long wire passing all round the theatre to increase the inertia, the rapidity of the oscillations was diminished until the crack of the spark was accompanied by a distinct musical note of very high pitch. By then introducing more jars so as to quadruple the capacity, the velocity was diminished one-half, and a note an octave lower was obtained. It was also demonstrated that just as the vibrations of a tuning-fork can set up similar vibrations in another fork tuned in unison with it, so the discharge of one Leyden jar can effect the discharge of another in its neighbourhood if they happen to be in unison; but if the length of current of one of them is altered so that they are no longer in harmony, this effect is not obtained. During these experiments an unexpected phenomenon was produced in the form of a brilliant and continuous succession of sparks on the wall of the lecture theatre, which was covered with a pattern in bronze or metallic composition, and had evidently become electrified by induction from the wire used in the circuit, which was suspended round the base of the gallery, concentric with the wall but at a considerable distance; the sparks were especially copious in the neighbourhood of the iron gratings used for ventilation. The lecturer explained that apparently he had unintentionally converted the wall of the theatre into the outer coating of a Leyden jar. The oscillatory character of the discharge was shown visibly as well as audibly by means of the effect produced by electrical stress in rotating the plane of polarized light. A beam of polarized light was passed through a tube of bisulphide of carbon surrounded by a coil, and then through the analyser on to a screen ; on turning the analyser so as to intercept the light, the passage of each discharge through the coil surrounding the carbon bisulphide was accompanied by the appearance of light on the screen. To show the oscillations the light, instead of being allowed to fall on the screen, was reflected on to a revolving mirror, when a rapid series of discharges was seen to produce a wavy line of light, instead of a straight one, as would be the case were there no oscillation.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of this Association was held at 103, Great Russell Street, on Thursday, March 7, Mr. E. J. Millard, President, in the chair.

The minutes of the previous meeting having been read and confirmed, the President called for the reading of a paper entitled—

Origin and Distribution of the British Flora.

BY W. A. SALTER,
Pharmaceutical Chemist.

Our subject appears to be best introduced by a very brief sketch of the various theories which have been put forward to account for the distribution of the plants at present spread over the surface of the globe. Linnæus held that their common birthplace was a high mountain tract in some tropical region. In such a position species adapted to all climates are found growing at different elevations. He considered that they spread gradually over the earth, each taking root where suitable conditions of temperature, moisture and soil prevailed. As will be seen immediately, several important objections to this theory have led to its rejection by botanists of the present day. The French naturalist Buffon suggested the idea that plants first came into existence in the Arctic regions and travelled gradually southwards. This view, though not now held in its entirety, has a considerable residue of truth in it, as will be shown later on. The next speculation generally accepted and long firmly held by botanists, was that of a number of centres of creation in different parts of the world, where groups of plants originated and from which they afterwards spread in all directions. This theory, however, has now given way to that which states, in the words of Darwin, that "each species has been produced in one area alone, and has subsequently migrated from that area as far as its powers of migration and subsistence under past and present conditions permitted." Many difficulties still exist in explaining how some identical species of plants met with in widely separated parts of the earth could have travelled from the single region in which they are believed to have originated, but most of these can be explained very rationally when the vast changes in the land surface and climate of the globe, of which we have undoubted evidence, are taken into consideration.

Following out the view which has just been stated, we should expect, speaking broadly, to find the same type of plant spread over large geographical areas not divided by any great natural barriers. This is extremely well borne out by facts, as we frequently find members of the same natural order or genus occurring throughout vast continents, though on passing from one part to another we meet with differing species, presumably all descended from a common stock, but modified by the various conditions to which they have been exposed. From these and other facts is derived the

opinion now almost universally held, that plant distribution has been controlled to a far greater extent by geographical considerations than by climatal ones, important as the influence of the latter undoubtedly is. Humboldt early perceived that climate will not explain "why equatorial Africa has no laurels and the New World almost no heaths, or why calceolarias are found only in the southern hemisphere." Darwin writes: "There is hardly a climate or condition in the Old World which cannot be paralleled in the New, at least as closely as the same species generally require . . . . . Notwithstanding this general parallelism in their conditions, how widely different are their living productions!" It is fully admitted, however, that circumstances of soil or climate often fix the range of species over smaller areas of the earth's surface. It is well known that many plants can flourish only upon a certain geological formation, *e.g.*, Mr. Baker points out that in Yorkshire the following plants accompany the calcareous strata and are not found on the intervening beds:—Columbine, rock rose, herb Robert, lily of the valley, and the bee and fly orchids. On the other hand, the foxglove will not grow on limestone. The Cornish heath is confined to the serpentine rocks, and two rare vetches are peculiar to the felspar of some of the Highland mountains.

We now pass to insular floras, which give us some of the most interesting studies in plant distribution. Wallace has worked out many of the problems which they present in his book on "Island Life." They are usually closely related to those of the nearest continent, but often fewer in numbers and containing species or varieties not found in the larger area. The more highly individualized such a flora is the longer its plants are supposed to have existed in an isolated condition. They probably reached the island first either when it formed part of some mainland from which it has since been separated, or the plants or their seeds may have been carried to it by various agencies, such as ocean currents, winds, or birds: as we know must have happened in the case of the coral islands of the Pacific.

The islands included in the United Kingdom, with which alone we can deal with in the limits of this paper, belong to the class of comparatively recent separations from a continent.

Within the latest geological period land was coninuous where the troubled waters of the English Channel now separate us from France; a rise of only 180 feet would be sufficient to again make the connection. Consequently our fauna and flora bear a very close resemblance to those of the rest of Europe.

We possess no peculiar species of mammals or reptiles, and only one amongst birds—the red grouse. In our flowering plants and ferns, excluding a fair number of *varieties* not found elsewhere, there are none which do not occur anywhere else in the world, though we have two or three American species which have not reached any other part of Europe. A few of our native plants range almost over the habitable globe, amongst them the daisy, shepherd's purse, and brake fern. The last edition of the London Catalogue enumerates 1810 species of flowering plants and ferns as found growing wild in the British Islands, but many of these are classed as mere varieties by some botanists or are not truly indigenous, and Bentham's Handbook only describes 1278. The catalogue roughly indicates the rarity or abundance of a species by giving the number of counties in which it has been reported as occurring. By dividing a few of the larger counties 112 areas are obtained. Only forty-two plants are found in all of these; thirty-three are dicotyledons, compositæ being responsible for eight; six are monocotyledons, including the yellow flag, four grasses, and a rush; and the remaining three are ferns; the common bracken, the male fern, and the polypody. Several very common species just miss the total. The meadow and creeping buttercups (*Ranunculus acris* and *repens*), marsh marigold and primrose being numbered 111, whilst two of our earliest and hardiest spring flowers, the lesser celandine and wood anemone, occur only in 105 divisions.

We shall now endeavour to trace the history of the vegetable inhabitants of Britain, for, as we shall see directly, they have not all been in possession of the soil for an equal length of time, but have entered upon it at different periods and from various directions. It will be necessary in the first place to sketch as briefly as possible the geological epochs through which the country has passed, for each of these had a characteristic vegetation of its own. It must be borne in mind that the records here compressed into a few sentences are those of countless ages of time. The fossil remains found in our oldest rocks show the existence of seaweeds, giant club mosses and horsetails, tree ferns and conifers, the forms gradually increasing in complexity in the latter deposited beds. In the next great period all those mentioned occur in forms much more resembling those of the present age, and towards the close of the epoch we have the first appearance of dicotyledons, which soon flourished in great abundance, the existing genera of *Salix*, *Acer*, *Populus*, *Quercus*, *Ficus*, *Pandanus*, etc., being represented. The latter point to a much warmer climate than we at present enjoy, and it may be noted that the same species occur also in the rocks of Greenland, proving that that frigid region formerly luxuriated in tropical heat.

Passing to the tertiary period (the one immediately preceding that in which we live), we find from the "testimony of the rocks" that the fossil flora approximates still more closely to existing forms, though their distribution is utterly at variance with that of the present time. Thus in Devonshire grew species of *Eucalyptus* (now the characteristic vegetation of Australia), as well as laurels, figs, cinnamons, vines, etc. It is at this time that the London clay was deposited. It consists of the silt or mud carried down by a great tropical river, and from its fossil remains palms, bananas and agaves, as well as more temperate species, must have grown beside it, and crocodiles and turtles have sunned themselves upon its mud-banks. This river, though not carrying any of the world's commerce upon it like its representative of the present day, was of gigantic proportions, and served to drain a continent on the same enormous scale. According to Professor Dawkins, Great Britain at this time formed part of a large continent, to which he gives the name of "North Atlantis." It stretched north and west to America by way of Iceland and Greenland, and extended also to the south-west across what is now the Channel to join France. In a later stage of the tertiary period we find that the tropical forms of vegetation have almost disappeared from Britain, and a flora existed not unlike the one now prevailing. In the uppermost strata are found remains of the Norway spruce, besides species of oak, yew, beech and Arctic willow. These point to a gradual change to a colder climate than before. Greenland, however, was still free from its coating of ice, as the members of the Arctic expedition of 1875 found in rock beds of this period traces of twenty-six kinds of plants, including a water-lily and conifers. The change to a severer climate appears to have gone on increasing until it culminated in a period of cold far beyond anything known in this country at the present time, and which is usually called the glacial period or the great ice age.

Few subjects have given rise to more controversy amongst geologists than the cause, date and duration of this cold epoch, and the various theories which have been put forward to account for it cannot be alluded to in detail here. The one most widely accepted,

however, ascribes it to the variation in the eccentricity of the earth's orbit, causing the globe to be, for many thousands of years, some millions of miles further from the sun than is now the case in our northern winter. The summer would then be hotter, but shorter, than at present, and it is believed that such a condition of things would be sufficient to bring about the accumulation of ice and snow which actually took place. Dr. Croll, the originator of the above theory, considers that the cold period held sway for 100,000 years, and that the ice-sheet disappeared from Britain about 80,000 years ago. Astronomers calculate that at certain intervals the eccentricity of the orbit would not be so great, and it has been fairly well established from geological discoveries that at times during the ice age a milder climate prevailed, giving us what are known as the interglacial periods.

Coincident with the gradual reduction of temperature which has been referred to, great changes in the land surfaces of the globe seem to have taken place. The connection between northern Europe and America was severed by the submergence of vast tracts of land, leaving only a few islands as Iceland, Jan Mayen, the Faroes, etc., as fragments of the former continent. The North Sea now came in and separated Britain from Norway, but we were still connected with Ireland and with the continent of Europe, forming part of a great extension of the latter to the westward, the boundary of which is probably indicated by the 600 feet line in depth of the sea bottom, as outside this the sounding lead shows a sudden dip to 1000 feet. As the cold became more intense the whole of northern Europe (including England as far south as the Thames) must have been subjected to a climate very similar to that of the Arctic regions at present, and in consequence became covered with a vast sheet of ice from which only a few rocky summits projected, just as is now the case with the interior of Greenland. The mountain ranges became the centres of enormous glaciers which slowly ploughed their way down the valleys, as those of Norway and the Alps are still doing. The latter are the much-diminished representatives of a glacial system, which at the time we are considering had centres also in the Scotch Highlands, the Cumberland mountains, the Snowdon range and the hilly parts of Ireland. These great ice rivers have left their traces upon the country in various ways, as Darwin says: "The ruins of a house burnt by fire do not tell their tale more plainly than do the mountains of Scotland and Wales, with their scored flanks, polished surfaces and perched boulders, of the icy streams with which their valleys were lately filled." We have evidence that the gradual sinking of the land which submerged North Atlantis must have proceeded still further during the ice age, for we find upon many of the Scotch and Welsh mountains at heights of 500 to 1000 feet, beds of marine shells belonging to this period; and in some of the lakes of Scotland occur Arctic shells and marine crustacea which indicate a former connection with a glacial sea. At this time the greater part of Britain must have been under water, and our present mountain summits would exist as rocky islands, upon the shores of which the icebergs that doubtless encumbered the ocean would sometimes ground. It is possible that a few of the rare plants of the Scotch mountains may have been conveyed to their present localities in this manner, for icebergs frequently carry soil as well as stones and vegetable débris, and thus occasionally a plant or its seeds might have been brought from a distance, and under favourable conditions have taken root in its new situation. Another confirmation of the existence of this state of affairs is the common occurrence upon mountains of several maritime plants, as the sea pink, scurvy grass and sea-side plantain, which are found nowhere in the intervening country between the hills and the coast.

In the course of ages elevation of the land must again have taken place, for we find Britain once more united to Ireland and the Continent, and extending far beyond its present limits. Many animals not now found in Europe roamed over the land, some of them belonging to tropical genera and others of an arctic type. The former class may have migrated thus far north during the hot summers, or more probably during the warmer interglacial periods; the fossil bones include those of species of rhinoceros, hippopotamus, elephant, bison, cave bear, and cave lion. Amongst the northern species were the mammoth, reindeer, arctic fox, and beaver. By the close of the glacial period several of these animals appear to have become extinct, some of them—as the mammoth—perhaps exterminated by man, whose existence has now been proved, at least, as far back as the end of the ice age. A most interesting memorial of this time of the infancy of the human race is the sketch of the mammoth carved upon a piece of its own ivory, which was found in a cave of central France, and a cast of which is in the British Museum. The majority of the arctic animals retreated to colder latitudes when the climate became warmer, and comparatively few which inhabited Britain at the time we are considering are now to be found within its borders.

Returning to the more immediate subject of this paper we will endeavour to trace the effects of the glacial period upon our flora. As the cold era gradually came on the tropical plants which still lingered in Britain (then a part of the continent of Europe) would be destroyed or would slowly retreat southwards, and their places would be taken by species coming from the north. At the same time the pre-glacial mountain plants would be driven downwards to the plains and would mingle with the newly arrived arctic forms. By the time that the cold had reached its height the whole of northern and central Europe would be characterized by plants of a northern type. A fair number of these species might survive upon our hill-tops the great submergence of the glacial period, but it is towards the close of the latter epoch, when Britain was again continental, that the immigration of plants began which at last resulted in the stocking of the country with those species which now form the greater part of its vegetation. Mr. Darwin thus describes what then took place:—"As the warmth returned the arctic forms would retreat northward, closely followed up in their retreat by the productions of more temperate regions. And as the snow melted from the bases of the mountains, the arctic species would seize on the cleared and thawed ground, always ascending, as the warmth increased and the snow still further disappeared, higher and higher, whilst their brethren were pursuing their northern journey." The plants thus left in isolated situations upon mountains have in many cases become considerably modified, and we often find varieties of the same species, or distinct species belonging to the same genus occupying different elevated regions.

Our own "alpine" or mountainous plants bear a close resemblance to those of Scandinavia and Lapland, but are poorer in the number of species. They give clear evidence of their original descent from high northern latitudes by the manner in which they are spread over Britain from north-east to south-west, as proved by the species reaching their southern limits at various points. Three Scandinavian plants stop short at the Faroe Islands, one only reaches to the Shetlands, several do not come beyond the mountains of north Scotland, others stretch to the Cumberland and Welsh hills; only a few extend to Ireland; and, taking a long leap, the last stragglers are found at high altitudes on the Alps, the Pyrenees, and the Carpathians. Hugh Macmillan, in his "Holidays on High Lands,"—a book which will well repay perusal— devotes

several chapters to the native alpine flora, and a few of its most interesting features may be selected for mention here. On ascending any of our higher hills the lowland plants gradually disappear, or those hardy ones which are met with at a higher altitude become so dwarfed and distorted owing to the unfavourable conditions to which they are exposed that they require a second glance from the botanist before they are recognized. Three zones of arctic vegetation are fairly well defined on the British mountains. The lowest or infra-arctic is entered upon at an elevation of about 1400 feet, where the last traces of cultivation are left behind, and with them the common brake fern. This zone extends to about 2000 feet, the highest range of the cross-leaved heath (*Erica tetralix*), so the cessation of this plant indicates its upper boundary line. Many lowland plants are still present, but with them occur the first alpine species we have met with, as for example the lovely yellow saxifrage (*Saxifraga aizoides*) growing in every boggy patch by the side of the mountain streamlet, and the alpine lady's mantle (*Alchemilla alpina*), with its inconspicuous greenish flowers and glistening dewy leaves. The next or mid-arctic-zone is defined by the range of the common heather (*Calluna vulgaris*). It reaches to 3000 feet, and includes by far the larger number of alpine species. Amongst these may be mentioned the roseroot (*Sedum Rhodiola*), a large kind of stonecrop which takes root in the crevices of the rocky crags; the smell of the root-stock when dried resembles that of roses. The mountain sorrel (*Oxyria reniformis*), with its kidney-shaped leaf, is also common. The super-arctic zone—above 3000 feet—is of course mainly confined to Scotland, as the English mountains scarcely attain that elevation. It is usually a bare, rocky and desolate region swept by fierce winds and storms. It has but few plants belonging to it, the most characteristic being the dwarf willow (*Salix herbacea*). By far the most beautiful, however, is the moss campion (*Silene acaulis*). Like many of the alpine plants, it grows in large patches with an abundance of brightly-coloured flowers, the latter a peculiarity regarded as due to the intense sunlight which they receive. A sheet of it measuring five feet across was found on one of the Westmoreland mountains a few years ago. Its vivid green moss-like foliage forms a most perfect setting to the brilliant rose-red flowers.

(*To be concluded.*)

Obituary.

Notice has been received of the death of the following:—

On the 28th of February, Mr. Allan Murray MacDougall, Chemist and Druggist, Bathgate, N.B. Aged 25 years. Mr. MacDougall was an Associate of the Pharmaceutical Society.

On the 4th of March, Mr. Henry Kimbell, Pharmaceutical Chemist, Knowle, near Birmingham. Aged 77 years. Mr. Kimbell was one of the Founders of the Pharmaceutical Society, having joined it in 1841.

On the 11th of March, Mr. Alfred Reeves, Chemist and Druggist, Everton, Liverpool. Aged 35 years.

On the 12th of March, Mr. Thomas McKenzie, Chemist and Druggist, St. Helens, Lancs. Aged 59 years.

BOOKS RECEIVED.

A Handbook of Cryptogamic Botany. By Alfred W. Bennett, M.A., B.Sc., F.L.S., and George Murray, F.L.S. London: Longmans, Green and Co. 1889. From the Publishers.

The Therapeutics of Kronenquelle Water. By Prosser James, M.D., F.R.C.P. London: Trübner and Co. 1889. From the Author.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Dale's Plaster.

Sir,—It may interest some of your readers at a distance from Newcastle to know what is the nature of the Dale's Plaster which has recently been the chief source of trouble in relation to the stamp duty in the north of England.

The following is the formula:—

Red lead	6 lbs.
Sweet oil	12 lbs.

Boil to a proper consistence, then add—

Resin.	
Yellow wax	each 3 lbs.

Melt and cut into ¾ ounce rolls.

The custom with the old lady while living was to have a few pounds of the rolls made and give them away to the poor, etc., and the custom of the trade since her death, now many years ago, has been to sell them at a penny each. The plaster probably acquired its popularity through being given by a charitable lady, and retained it through being sold for a penny.

11, *Grey St., Newcastle.* Barnard S. Proctor.

Sale of Medicated Wines.

Sir,—In your leading article on this subject (March 9), you say the only way out of the difficulty raised by the Excise is, for Chemists to take out retail wine licences. Perhaps you may not be aware of another obstacle which red-tape has devised? Some time ago I proposed to take out a wine licence, in order to supply Vin Mariani, St. Raphael wine, and two or three other medicated wines which are not unfrequently ordered by our medical men here, but was at once told I could not hold a wine licence and a methylated spirit licence at the same time, unless the methylated spirit were sold in *sealed* bottles only and stored in a separate room from the wines.

Now the sale of methylated spirit *pays*, whereas the sale of the medicated wines would only be a convenience to patients, and would probably barely pay for the licence, hence I prefer to retain the sale of the former.

Station Road, Harrogate. Freshfield Reynolds.

The Molybdate Test for Hypophosphites.

Sir,—With the aid of Mr. Millard's further directions I have been able to perform the test satisfactorily, and should no doubt have done so at first had he been a little more explicit.

In his article he merely says a "nitric acid solution of the molybdate" is to be used. This I understood to mean the ordinary weak solution used in estimating phosphates in manures, etc., and with which I was unable to obtain the reaction. Referring to his article on "Water Analysis" I find he recommends a very strong nitric solution. With it the blue coloration is obtained immediately.

The HCl which I added in the first instance no doubt contributed the additional amount of acid necessary.

Dale End, Birmingham. W. R. Hedges, Junr.

R. Gibson.—Your letter has been handed to the Secretary, to whom all complaints as to irregularities in the transmission of the Journal should be sent.

Tyro.—We cannot find that anything has been published on the subject.

L. Watson.—Practically the decision was to the effect that a corporation is outside the operation of the Act, but there were clear indications that the judges did not consider that the same immunity would extend to the person effecting the sale.

Benevolent Fund. Erratum.—The following was accidentally omitted from the list of subscriptions published on the 23rd of February:—Loveluck, G. D., Cardiff. Annual Subscription, 2*s.* 6*d.*

Communications, Letters, etc., have been received from Messrs. Humphrey, Ellwood, Lovibond, Richardson, Pain, "A Friend of the Bill."

FURTHER NOTES ON MASSOI BARK.

BY E. M. HOLMES, F.L.S.,

Curator of the Museum of the Pharmaceutical Society of Great Britain.

Since the publication of my last note on massoi bark, it has been pointed out to me by Mr. W. T. Thiselton Dyer, F.R.S., that in the Kew Gardens Report for 1880, this bark was noticed as follows:—

"This aromatic product has long been known as an article of commerce in the Malay Archipelago. It is derived from a tree of the laurel family (*Laurineæ*) which is indigenous and apparently confined to the forests of Southern New Guinea. The botanical determination of the species has long been desired, and during the voyage of H.M.S. *Challenger*, Mr. H. N. Moseley, F.R.S., one of the naturalists attached to the expedition, succeeded in obtaining specimens both of the bark, as well as fruits, which were deposited in Kew Museum. These suggested an affinity with the genus *Cryptocarya*. Subsequently, during his travels in New Guinea, D'Albertis made a small collection of plants which were examined by the distinguished traveller and botanist Beccari. I extract the following note from the appendix to the English edition of D'Albertis's 'New Guinea' (vol. ii., p. 398, *Massoia aromatica*, Becc. *Sassafras Goesianum*, 'Cat. Hort. Bot., Bog.'). In D'Albertis's collection there is but one small specimen of the bark of this Laurinea, which is highly aromatic, and in great request by the Malays as an article of commerce. I have been obliged to find a new generic name for this plant, which it is a positive error to call a *Cinnamomum* or a *Sassafras*, as has hitherto been the case, both flowers and fruits having been unknown. From an examination of imperfect specimens, it appears to me that the flowers are those of a *Cryptocarya* and that the fruit resembles that of the Madagascar Ravensara, the seeds having the appearance of being entirely ruminated. The name *Massoia* I derive from 'massoi,' the Malay name of the plant."

It thus appears that a new name has been given to the plant by Beccari, on the strength of an examination of imperfect flowers, fruits and bark. On comparing the massoi bark in the Society's Museum with Moseley's specimens of the massoi bark at Kew Museum, they were found to be identical in structure and flavour. The fruits as described by Beccari have cotyledons deeply pierced by the endopleura, which gives them a distinctly ruminated character. On comparing the leaves and fruit of the massoi tree presented to the Pharmaceutical Society by Professor Van Eeden with the type specimen of *Massoia aromatica* at Kew, received from Dr. Beccari, the leaves were found to agree exactly in shape and texture and veining with some of the leaves on Dr. Beccari's specimen, which are believed by Professor Oliver to be those of a flowering shoot. A second twig on Dr. Beccari's specimen has longer and more oblong lanceolate leaves, with the upper surface reticulated.

This difference may be due to the latter being derived from a growing shoot, since these are often larger and more succulent than the leaves near the inflorescence. These longer leaves agree exactly with a specimen in the Hanbury Herbarium labelled "*Sassafras? Goesianum*, T. and B., 'Massooi' incol. 'Cat. Plant. Hort. Bot., Bogoriensis,' 1866, p. 94, Java, S. Binnendyk, 1867." As these specimens all agree, there can be no doubt that the massoi bark presented by Professor Van Eeden and now in the Museum of the Pharmaceutical Society, is the genuine drug, and is the product of the tree called by Beccari *Massoia aromatica*, and also that the specimen in the Hanbury Herbarium belongs to the same plant.

Since the last note was written Messrs. Schimmel and Co. have favoured me with specimens of the bark supposed to be massoi bark, and which afforded an oil having an odour of cloves and nutmegs. This bark is quite different from massoi bark. The quilled pieces externally are of a pale brown, with numerous dark brown warts, about a quarter of an inch apart, scattered over the surface. Under a lens it is seen to be minutely cracked longitudinally. The inner surface to the naked eye appears smooth. The fracture is short, somewhat stratified in a tangential direction, with few short projecting hair-like fibres, especially towards the inner surface. The odour of cloves is very strong, and the inner surface is evidently very rich in oil, since pressure with the nail forces it out. The taste is pungent, caryophyllaceous and slightly astringent. The larger pieces appear similar in structure. but the taste resembles sassafras, the outer surface is not cracked, but has a whitish silvery layer like that on Carthagena cinchona (*C. lancifolia*). It is lighter in proportion to its size. Were it not for the known fact that cinnamon produces different oils in both leaf and root I should not hesitate to say that both the quilled and the larger specimens above described were produced by different trees. In the absence of sufficient information to determine their identity, it is not possible to say more than that the bark employed by Messrs. Schimmel is not the true massoi bark, and that the characters of the oil distilled by them should not be attributed to *Massoia aromatica*. The quilled specimen of Schimmel's massoi bark does, however, agree fairly well, allowing for the difference in age, with the specimen of *Cortex Culilabani Papuanus* in the Hanbury collection—the botanical origin of which, however, is unknown.

The bark received from the Haarlem Museum under the name of *Cinnamomum xanthoneuron* (see ante, p. 465) has been found by Mr. W. Kirkby, who has kindly examined it for me in microscopic section, to be identical with *Massoia aromatica*.

NOTE ON GAMBOGE.

BY GEORGE H. HURST, F.C.S.

I have recently made an analysis of a sample of gamboge with the following results:—

Moisture	2·50 per cent
Mineral matter	1·05 „
Resin (from ether)	66·05 „
Wax (from alcohol)	4·31 „
Gum	26·03 „
	99·94.

The resin was of a reddish orange colour, transparent, glassy-looking, very brittle, breaking with a conchoidal fracture. Softens easily on heating and melts about 75–80° C., solidifying on cooling to a glassy mass.

It is readily soluble in alcohol, in ether and chloroform, but only slightly soluble in petroleum spirit. Sodium hydroxide solution dissolves it with an orange red colour, and from this solution hydrochloric acid re-precipitates it in the form of gelatinous flakes. It has no taste or apparent purgative action.

The wax (from alcohol) is a peculiar looking

brownish mass with a waxy lustre; it is soft, melts easily, has a peculiar but slightly bitter taste, and leaves a bitter after-taste, which is perceptible for some time; it has also a slight purgative action. It dissolves readily in caustic soda, forming a brownish yellow solution from which acids precipitate it as a light flocculent mass. It evidently undergoes a quasi saponification.

The gum is a transparent brownish mass with a sweetish taste and slight adhesive properties. It dissolves in water, forming an opalescent solution which does not give precipitates with mercury chloride, lead acetate or alcohol; dilute acids dissolve it to clear solutions. Strong nitric acid has an energetic action on it, forming mucic acid, but no oxalic acid.

It has a slight reducing action on Fehling's copper solution; but on boiling with dilute acids this action is considerably increased. It is, therefore, a glucoside.

Manchester.

THE SOLUBLE GUM OF TRAGACANTH.*

BY JOHN M. MAISCH.

From an attentive student at a College of Pharmacy a letter was recently received as follows:—

"While comparing your 'Manual of Organic Materia Medica' with the United States Pharmacopœia, I find a point where your book differs from the latter. You state that the fluid portion of the gelatinous mass, obtained by treating tragacanth with water, is precipitated by alcohol, while the Pharmacopœia says, this is not so. Is this statement of the Pharmacopœia correct?"

My attention having thus again been called to this statement of the Pharmacopœia, it was determined to repeat an experiment frequently made in former years. Some thin flakes of white tragacanth were washed with cold water, and then soaked in sufficient water without applying heat; cold water was then added from time to time with agitation, until the gelatinous mass remained sufficiently thin after standing for some time to permit the fluid portion to be separated by means of a wetted filter. On pouring some alcohol upon the clear filtrate, both layers remained clear also at the point of contact, and on mixing the two liquids, the transparency of the mixture was apparently not disturbed immediately; but on close examination the formation of a transparent jelly could easily be distinguished, and this separated after a while in the form of whitish flocks rising to the surface. The result corroborates that of experiments previously placed on record by others, and proves that a portion of tragacanth is soluble in cold water, and that this solution *is* precipitated by alcohol. In performing this experiment, it is necessary to avoid the use of heat, since tragacanth always contains starch which would be dissolved by hot water.

It seemed of interest to ascertain, if possible, how the error alluded to crept into the United States Pharmacopœia. Very probably it was copied from the British Pharmacopœia of 1867, as will be seen by comparing the texts of the two authorities:—

B. P., 1867.	*U. S. P.*, 1880.
. . . . Swelling into a gelatinous mass which is tinged violet by tincture of iodine. After maceration in cold water the fluid portion is not precipitated by the addition of rectified spirit.	. . . . Swelling with water to a gelatinous mass, which is tinged blue by test solution of iodine, and the fluid portion of which is not precipitated on the addition of alcohol.

* Read at the Philadelphia Pharmaceutical meeting. From the *American Pharmaceutical Journal*, February.

The close similarity in the phraseology of these sentences leaves scarcely any doubt about the origin of the last one. The same error found also its way into the present British Pharmacopœia, published in 1885, the statement differing from the above quotation mainly in describing the colour produced by iodine to be violet or blue.

It was to be expected that the statements of recent English and American writers on materia medica and on chemistry would differ in regard to the question involved, and that some of them would have adopted, without reserve, the characterization of tragacanth as given by the two Pharmacopœias, while others would give it as ascertained by experiment or from the writings of others. Such has indeed been found to be the case, as will be seen from the following brief summary.

Regarding merely the effect of water upon tragacanth, the latter is described by Bloxam, Edes, Fownes and Wood, as being *not soluble*, but merely swelling in water. The property of swelling with water to a gelatinous mass is, as a matter of course, mentioned by all writers; but in addition to this tragacanth is described to be *sparingly* or *very sparingly soluble* in water by Allen, Brunton, and Milne (edit. by Craig). These writers do not allude to the effect of alcohol upon the soluble portion.

In several works the correct statement is made that tragacanth is insoluble in alcohol; but this property does not throw any light upon the behaviour of the aqueous solution, since some of the vegetable mucilages are insoluble in alcohol when treated directly with this liquid, while their aqueous solutions are not disturbed on the addition of alcohol.

A nearer approach to the behaviour of the water-soluble portion of tragacanth is found in Attfield, Biddle, and in Bentley and Trimen's Medicinal Plants, where that portion is said to *resemble* arabin, but the points of resemblance or difference are not given. Potter and Prescott (proximate analysis) state the soluble gum *to be* arabin.

The language of the British Pharmacopœia is quoted in the works on Materia Medica by Bentley, Bruce, Gerrard and Thorowgood, the last two stating that the alcohol test (non-precipitation of the aqueous solution) shows the absence of gum arabic.

The correct behaviour towards alcohol is given in 'Pharmacographia' and in the manuals of Muter, Royle (edited by Harley) and Wills.

About half a century ago Pereira, in his materia medica, gave the following account, which was reproduced in the later editions:—"The soluble gum of tragacanth is usually regarded as similar to gum arabic, and hence it is called arabin; but is distinguished by silicate of potash and perchloride of iron producing no change in it, and by a peculiar appearance of the precipitate produced with alcohol (the precipitate is flocculent and collects in a simple opaque and mucous mass). In common with arabin it produces precipitates with diacetate of lead, protochloride of tin and protonitrate of mercury. Oxalate of ammonia detects in it a calcareous salt."

Gmelin's chemistry (Cavendish edition, XV., 209) states: "Tragacanth jelly curdles a solution of bichloride of tin; according to Bostock it forms a reddish precipitate with mercurous nitrate: according to Pfaff a white precipitate with both mercurous and mercuric nitrate. It is precipitated by alcohol."

The use of the word *not* in the sentences quoted above from the Pharmacopœias was probably at first an inadvertent error, as suggested by Oldberg and Wahl's 'Companion;' but since such errors are likely to be perpetuated in print, it was deemed advisable to again call attention to it at the present time.

The Pharmaceutical Journal.

SATURDAY, MARCH 23, 1889.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE MICROSCOPE IN PHARMACY.

IT seems but reasonable to expect that every man should be expert in the use of such tools and apparatus as may be of any use whatever to him in his trade or profession. More especially so when the health and life itself of the community he serves depend greatly upon the outcome of his labours. Of course all this should go without saying, and our present task would be a needless one were it not that expectations are often disappointed. Carelessness and indifference are so apt to displace the eager experimental spirit that we may well be excused bringing anew before the notice of British pharmacists generally possibilities which now lie latent within their grasp and might be realized would they but use more frequently one instrument that deserves all the attention that can be devoted to it. Our intention is briefly to suggest that their use of the microscope may well be extended.

It is not by any means a new instrument of research. Its antiquity will compare favourably with that of most other aids to scientific investigation now in vogue, and, unlike some of these, it has certainly never been of greater use at any time than it is at the present day. Neither is its employment in the branches of science which most concern us very limited in point of time. Many years ago, in its then comparatively imperfect form, RASPAIL made it serve him well in his work on organic chemistry, and since then its sphere of usefulness has steadily enlarged. The science of biology, once most deficient in trustworthy facts and uncertain in its theories, has in recent years become entitled to rank with the so-called exact sciences. The modern microscope, continually being modified and improved, has enabled patient workers to disclose secrets of nature which could by no other means have been laid bare. Where the test-tube and dissecting knife have failed to make facts more clear to the unaided human eye, the interposition of a series of lenses has helped make old facts plain, or to expose errors, whilst making manifest hundreds of new facts. Old theories have been discredited and new ones developed when the great flood of light has made so clear the nature of things in themselves. Indeed, it may fairly be said that by means of this aid physiology and botany have been placed upon a totally new footing.

In medical science the microscope has already made for itself a secure position, so that elementary students are now examined as to the appearances of various tissues when viewed by its aid. Will not pharmacists exert themselves to prevent it becoming a reproach to them that they have neglected its teachings? Its use has been again and again practically illustrated to them in their own proper sphere. Some years ago a series of papers on the application of the microscope to the study of materia medica appeared in our pages; the 'Pharmacographia' has given detailed descriptions of the microscopic structure of the drugs of which it treats; and, more recently, we have had the usefulness of the instrument demonstrated on many occasions in the researches of several practical pharmacists. It so happens also that the subject in the study of which they can most beneficially to themselves and their profession apply it, is that in which its use is best learnt. Professor STRASSBURGER tells us that "the study of vegetable "structure is especially favourable as an initiation "into the use of the microscope; and any one "whose future career will require command over "this instrument should commence with the study "under the microscope of vegetable anatomy." Since so much regarding the minute structures of plants and their products remains to be discovered and explained, we cannot insist unnecessarily upon the importance of the study. The work interests and the results are likely to be immense in number and importance. Students should reflect how greatly their mental labours would be lightened, and how much more interesting they would become, if they were themselves to demonstrate practically the facts which they now trust to letterpress and book-illustrations to explain. The different kinds of cells and tissues are remembered with ease if they have been seen, whereas one may spend hours with a book alone endeavouring to grasp the idea of the bordered pits in the pine. Then the qualified pharmacist has here the means of retaining his interest in all his old studies, and of applying his knowledge in fresh directions whilst enjoying a pleasant means of recreation. A lesser motive to prompt attention is that in a few years the pharmaceutical examination syllabus may include amongst other requirements familiarity with the use of the microscope, but this is as nothing compared with the main reason, which is that always and in every way we should labour to keep our scientific equipment complete and in working order.

A communication has been received from Mr. W. H. Francis stating that the Committee of the Chemists' Annual Ball has decided that the sum of fifteen guineas out of the proceeds of the recent ball should be given to the Benevolent Fund.

A small balance having been left in the hands of the Treasurer to the Bentley Testimonial Fund, after the Presentation to Emeritus-Professor Bentley last October, it was determined by the Executive Committee that this sum should be expended in supplying to each subscriber a photographic copy of the portrait of the Professor, and we are now informed by the Honorary Secretary that these copies will be distributed in a few days.

* * *

We regret to announce the death, on the 16th instant, in his eighty-sixth year, of Mr. Joseph Barber, who in 1883 was elected an Annuitant on the Benevolent Fund. Mr. Barber was connected with the Pharmaceutical Society from the year 1842.

* * *

Notwithstanding the circumstantial statements as to the date of the next International Pharmaceutical Congress that have appeared, based presumably upon special information, it appears now that this meeting will not take place during the current year. According to the *Pharmaceutische Post* a meeting of the Executive Committee was held in Milan on the 24th ult., when after a long discussion it was resolved that the Congress should not be held until the beginning of September, 1890. Among the reasons given for not holding it this year were the conflicting attractions of the International Exhibition in Paris, and the occurrence of the communal elections in Italy. In quoting this information from a contemporary it will not be out of place to remark that if the Executive Committee wishes to give the Congress a chance of success even for next year, it is already time that steps were taken to open up communications with those pharmaceutical bodies in different parts of the world whose co-operation will be necessary. Up to the present time there has been considerable reticence, to say the least, in replying even to official applications for information upon the subject.

* * *

Pharmacy in Bulgaria forms the subject of an interesting communication to the *Zeitschrift* of the Austrian Pharmaceutical Association, from which it appears, as might be expected, that the condition of the calling in that country leaves much to be desired. Under the rule of the Turks, the pharmacist, as such, had no recognized place in Bulgaria, pharmacy being then closely combined with medical practice. The medical men however did not command the confidence of the public, and as a consequence they met with severe competition from quacks and from shopkeepers who sold and recommended drugs to a considerable extent. After the Russo-Turkish war, and the consequent exodus of Turks from Bulgaria, the administration of the law was improved and greater attention was paid to sanitary affairs. Hospitals were established, furnished with pharmacies, from which medicines were supplied also to persons not receiving medical treatment at the hospital, the dispensing being done partly by the ordinary physician and partly by an assistant who had received some training in a military medical school. These institutions, although ill-furnished and limited to the barest necessities, gradually educated the public to appreciate the advantage of having well-regulated pharmacies, and led to the starting of independent establishments, which, however, from the paucity of the supply of qualified pharmacists were at first found only in the larger cities. Even now there are cities with ten thousand inhabitants, the centres of districts containing six or seven times as many, with only one pharmacy. Nevertheless the business transacted under these conditions is not nearly what might be expected, on account of irregular competition. Stringent laws have been enacted regulating the practice of pharmacy, but at present the authorities charged with carrying them out manifest great tolerance of offenders. These laws regulate the granting of concessions to conduct pharmacies, their management, the charges for dispensing, and all the relations of the pharmacist towards the magistrates and the public, and their enforcement is entrusted to the Sanitary Council in Sofia, consisting of a general inspector, several assessors, among whom are a chemist and a veterinary practitioner, and the district physician. The establishment of a pharmacy is dependent upon population, eight thousand inhabitants in a city being allowed to one business. Any Bulgarian holding a diploma is entitled to a concession, but a foreigner must in addition submit to an examination in pharmacognosy, analysis of drugs, and inorganic and organic chemistry. Twice a year, at least, every pharmacy has to be visited by authorized inspectors, who examine the books, compare the charges for dispensing with the official prices, inspect the arrangements of the laboratory and stores, test the quality of the drugs, and ascertain that a sufficient stock is kept. Every master pharmacist is under the present law required to take two pupils, who must be Bulgarians that have received a certain scholastic education; he receives no premium, and frequently has to provide them with clothes and pocket-money. The pupillage lasts three years, and at the commencement of each year the master has to report to the sanitary board as to each pupil's moral conduct and progress in pharmaceutical science. At the end of the term the pupil goes before an examining board consisting of a doctor, a government chemist and a pharmacist, and is tested in his knowledge of the laws relating to pharmacy, the pharmacopœia (Russian), the recognition of drugs, the making of one pharmaceutical chemical and the practical work of a dispensing counter and laboratory. The pharmacist is in many places entirely dependent upon the doctor, as the retail sales are very small, and it frequently happens that in a large town the day's turnover is not sufficient to pay expenses. Under the circumstances the establishment of a pharmaceutical association is considered very desirable as a means for securing the enforcement of the law against irregular competitors.

* * *

The anniversary meeting of the Chemical Society will be held on Thursday, March 28, at 8 p.m., when the President will deliver an address on "Recent Researches on the Rare Earths, as interpreted by the Spectroscope."

* * *

At a meeting of the Chemists' Assistants' Association to be held on Thursday, March 28, at 103, Great Russell Street, W.C., a paper will be read entitled, "Some Reasons why the Present Pharmacy Bill should not become Law," by Mr. R. Winfrey.

* * *

The next meeting of the School of Pharmacy Students' Association will be held on March 28.

Transactions of the Pharmaceutical Society.

EVENING MEETING IN EDINBURGH.

The fourth evening meeting in Edinburgh of the present session was held in the Society's House, 36, York Place, on Wednesday, March 13, at 8.30, Mr. William Gilmour, F.R.S.E., in the chair.

The minutes of last meeting having been read and adopted, the following communications were read:—

Compound Liquorice Powder: An Improved Formula.

BY J. H. FISHER.

Prior to the publication of the 1885 Pharmacopœia, but when the German recipe for compound liquorice powder was by far the more popular one, a suggestion was made to me by a medical practitioner in large practice that this recipe might be improved upon. He was of opinion that the sugar might advantageously be in part replaced by cream of tartar.

Accordingly, after various attempts to produce a reliable as well as agreeable preparation it was found that the following recipe was in both respects satisfactory:—

Senna	2 parts
Liquorice powder	2 ,,
Fennel	1 part
Sublimed sulphur	1 ,,
Cream of tartar	4 parts
Sugar	2 ,,

In other words instead of using six parts of sugar as directed in the 1885 Pharmacopœia, I would recommend four parts of cream of tartar and only two parts of sugar.

It is more than six years since I first prepared this powder and it is now in almost every instance the kind which is asked for. Popular experience and judgment may therefore be said to be decidedly in favour of the above modification of the official formula. I have also obtained the professional opinion of the medical practitioner at whose suggestion the modified formula was first adopted, and also that of another practitioner under whose notice I brought the new powder. They entirely concur in their opinion, which may be briefly summarized as follows:—

(1) It possesses a tart, pleasant taste decidedly preferable to the ultra-sweet sickly taste of the official powder, and is in consequence more readily taken by children.

(2) It is more readily miscible with water. On carefully placing a small portion of each sample in separate glasses containing water, the new formula sample sinks more rapidly than the other.

(3) It possesses diuretic and refrigerant properties, and this is a very decided advantage.

(4) The addition of the cream of tartar tends to counteract the griping action of the senna and to correct the objectionable effects of the sulphur (it may be remembered that owing to the various disadvantages of sulphur, it was omitted altogether from the 1867 formula).

(5) It is a more reliable and powerful aperient.

(6) In no single instance has the addition of cream of tartar been found to be objectionable in cases wherein compound liquorice powder is usually employed.

In addition to the medical testimony referred to, I am supported by most writers on pharmacy as to the value of cream of tartar as an addition to powders containing sulphur and senna. Christison mentions that the laxative effect of sulphur is increased by the addition of cream of tartar. Thus the dose of sulphur when given alone is from 1 to 2 drachms while in conjunction with cream of tartar, only thirty grains are required to produce the same effect. By most therapeutists cream of tartar and confection of senna are stated to be suitable adjuncts of sulphur—in the proposed new formula there is practically a combination of all three.

In Martindale's 'Extra Pharmacopœia,' reference is made to a suggestion in the *Lancet* (October 2, 1886), that anise fruit should be substituted for fennel and ginger for one quarter of an ounce of the sugar. This alteration was proposed by Dr. Martin Oxley, who found that the official powder occasionally produced severe griping, especially in children. Now cream of tartar, as I have shown, tends to obviate this griping tendency, and is of great advantage otherwise, while anise possesses no advantage over fennel, and the ginger might in some cases be objectionable. I should say therefore that the powder I suggest is a more excellent preparation.

Since the appearance of Professor Attfield's pamphlet on "Saccharin in Pharmacy," I have made some experiments with saccharin as a substitute for sugar in the powder under review.

The use of 9 grains of saccharin in place of 6 ounces of sugar, as suggested by Professor Attfield, appears sufficient. Instead, however, of substituting saccharin for sugar, and thereby reducing the dose to from 15 to 30 grains, I would strongly recommend that the saccharin be added to the formula, and cream of tartar substituted for the total quantity of sugar at present used, and then the dose might still remain *in statu quo antea*.

Mr. J. B. Stephenson said that the meeting was indebted to Mr. Fisher for having brought forward this suggestion, but he thought it was to be regarded as the introduction of a new preparation rather than a modification of an old one, as the addition of cream of tartar would entirely alter the action of the powder. The fact that the new powder was more miscible with water was an advantage.

Mr. Gibson said he thought the new form was an improvement. He had made a similar powder many years ago, and found that the powder with cream of tartar was much superior.

Mr. Boa said he had had occasion to add cream of tartar to the powder about eight or ten years ago, and found that it was much preferable to the present official form.

Mr. Lunan thought the liquorice was sufficient for sweetening purposes, and he had found that the powder made without sugar gave good results.

Mr. Arthur thought the extreme miscibility of the new powder was rather against it, as it rapidly settled out, while the official powder remained suspended in the water. He also thought the presence of so much cream of tartar, which always contained sulphate of lime, would be objectionable in the case of children.

Mr. Maclaren suggested that the cream of tartar might be substituted for a portion of the sulphur and the sugar left as at present.

Mr. Hill said the objection mentioned by Mr. Stephenson had also occurred to him, but he observed Mr. Fisher stated that no objection had been found in practice in any of the cases for which compound liquorice powder was usually employed. It was also stated that cream of tartar tended to obviate the objections to sulphur, and if so it would be a decided advantage.

Mr. Fisher in replying said he thought the small quantity of sulphate of lime could hardly do any harm. The cream of tartar acted as a corrective, both of the objectionable effects of sulphur, and of the griping effects of the senna, and the effects of the new powder were on the whole better than those of the old.

In the absence of the authors the following communications were read by the Assistant Secretary :—

Notes on Suspending Bismuth Subnitrate in Mixtures.

BY SAMUEL LAWRENCE, OBAN.

Much has hitherto been said and written on this subject. In this short paper are detailed a few attempts which I have made to overcome the difficulty.

The suspending agents employed were (1), mucilage of gum acacia ; (2), mucilage of gum tragacanth ; (3), compound powder of tragacanth ; (4), glycerine ; and (5), syrup. The samples before you were prepared on the 27th ult.

1. *Mucilage of Gum Acacia.*—This yields a very unsatisfactory mixture. It has been stated that, for proper suspension, each part of bismuth subnitrate requires three parts of this mucilage, but I have found that even if it be used in a larger proportion, no better result is obtained, the bismuth and mucilage, very soon after the mixture has been dispensed, settling down at the bottom of the bottle as a glutinous indiffusible mass, which no amount of shaking can again diffuse through the mixture. (Sample shown.)

2. *Mucilage of Gum Tragacanth.*—This is more viscous than acacia mucilage, contains a relatively smaller amount of solid matter, and is therefore more suitable, although yielding a mixture far from perfection. Four parts of it to one of bismuth subnitrate give the best results. In this proportion the mixture when dispensed appears all right, but in a day or two afterwards the bismuth and tragacanth will be found to have run into small knots, which, when shaken up, subside so quickly that the patient cannot possibly measure out fixed portions containing equal doses of bismuth. (Sample shown.) Most writers assert that bismuth and tragacanth settle at the bottom of the bottle as a gluey indiffusible mass, as is the case when acacia mucilage is used, but this statement is incorrect ; they combine in the form of small knots, as I have shown.

If a little glycerine be added to the mixture it will be found on shaking up that separation takes place more slowly, an apparent advantage for the patient. A correspondent of the *National Druggist* has recently recommended this addition to mixtures in which bismuth is suspended in mucilage of acacia or tragacanth ; with tragacanth this addition is an improvement, but with acacia it does not prevent the bismuth and acacia settling down as a glutinous indiffusible mass. (Samples shown.)

3. *Compound Powder of Tragacanth.*—This is preferable to mucilage of tragacanth, as the presence of sugar in it lessens the tendency of the bismuth and tragacanth to run into knots, and the starch being insoluble in water renders the sediment denser, and more easily shaken up.

Squire states that "for suspending heavy insoluble powders in liquids, compound powder of tragacanth, equal to the weight of the powder itself, may be used." With bismuth subnitrate I have obtained best results by using only one-fourth of its weight of compound powder of tragacanth (sample shown), for if a large quantity be employed the mixture will be rendered too thick to admit of its being poured from an ordinary dispensing bottle. Bismuth subnitrate ℥j., compound powder of tragacanth ℥j., and water to ℨj., solidify almost immediately after being mixed together.

4. *Glycerine.*—This may perhaps be looked upon as the most suitable agent. I obtained best results by using four parts of it to each one of bismuth subnitrate. (Sample shown.) The bismuth should first be rubbed in a mortar with its own weight of water before adding the glycerine; indeed, it is always advantageous to proceed thus when a liquid suspending agent, such as mucilage of acacia or tragacanth, glycerine or syrup, is ordered. In a mixture containing bismuth and glycerine, the bismuth will be thoroughly diffused through it, after the bottle has been well shaken, and will remain so for a sufficient length of time to admit of portions containing equal doses of it being poured out.

Amongst the advantages which I claim for glycerine over other agents, I might mention—

(*a*) Tinctures and spirituous preparations can be added without affecting to any extent its suspending properties.

(*b*) Large quantities of bismuth can be dispensed, say ℥j. or ℥jss. in each ℨj. of mixture, without its being rendered objectionably thick.

(*c*) Considered from a medicinal point of view, in some forms of stomach disorder for which bismuth is extensively prescribed, I have been informed on medical authority that glycerine is a less objectionable agent than acacia or tragacanth, as the presence of gums in large quantities has a deleterious effect upon those structures of the stomach by which the gastric juice is secreted.

5. *Syrup.*—I have tried this in the same proportions as with glycerine, and obtained good results. (Sample shown.) Its suspending power is, however, slightly less than that of glycerine.

Since making these notes I observe that the *American Journal of Pharmacy*, in reviewing the "Art of Dispensing," takes exception to the remarks therein contained on bismuth mixtures, and condemns the use of gums, preferring glycerine or syrup. I have not tried Irish moss mucilage, as Mr. Peter Boa of Edinburgh, in a paper read before this Society some time ago, reported this unsuitable, the bismuth at once settling down, and would not again shake up.

I might also, while bismuth subnitrate is before us, point out that the dose as stated in the British Pharmacopœia, viz., 5 to 20 grains, is misleading; much larger doses than 20 grains are often given, some physicians prescribe it in teaspoonful doses. The official dose of liquor bismuthi et ammonii citratis is ½ to 1 fluid drachm, whereas doses much in excess of this are also given.

Mr. Nesbit said this was a practical paper, dealing with a subject of general interest. He had frequently had difficulty with tragacanth and bismuth from their tendency to get into a lumpy condition. He found that if the bismuth was previously washed with water it made a more satisfactory mixture with the gum. As to the addition of glycerine there was no doubt it was an efficient agent for the suspension of bismuth, but he doubted if they would be justified in using it without medical sanction. He thought it might not be suitable in cases of gastrodynia or diarrhœa.

Mr. Boa said he had found that different samples of acacia gum gave different results when used to suspend bismuth salts. There were also two varieties of subnitrate of bismuth in the market, one amorphous and the other crystalline. Mr. Lawrence did not state which variety he had used, and it might be an advantage to try comparative experiments with both.

Mr. Gibson said he had also experienced the difficulty met with in suspending bismuth subnitrate with gums, and was inclined to think it was due to double decomposition. He thought it was best to dispense bismuth salts with water only.

Mr. Duncan suggested that an insoluble gummate was formed, which could not be diffused. He had observed that many samples of bismuth subnitrate gave off ammonia when mixed with sodium bicarbonate. This was probably due to the fact that makers added ammonia to the solution during manufacture, in order to avoid loss of bismuth, and this ammonia might have something to do with the formation of the indiffusible sediment.

Mr. Lunan said different bismuth salts required different gums. Bismuth hydrate, for instance, formed a solid mass with tragacanth, and must be suspended with acacia. He thought glycerine would not always be a safe addition.

Mr. Macpherson said he thought Mr. Lawrence had used too much gum in the samples shown, and suggested that he would have got better results had he used a smaller proportion.

The Chairman said his own feeling was that the less suspending agent used in these mixtures the better. This paper had helped to ventilate the subject, and would do good by bringing under the notice of medical men certain facts of which they might not be fully aware.

Missisquoi Water.

BY THOMAS MABEN.

Some half dozen years ago there was in my district a demand for Missisquoi spring water, which has the reputation of being a specific remedy for cancer, and it was for two such cases that I was asked to supply the water. The patients, both of whom were females, professed to be very much benefited by the treatment, but most unfortunately both departed this life before the cure was complete. The result was that I had thrown on my hands a dozen or so bottles of the liquid. These bottles have remained on my shelves ever since, and would doubtless have still been there, but for an inquiry some eight or ten months ago in the columns of the *Chemist and Druggist* as to the composition of Missisquoi water.

From a pamphlet published by the proprietor of the spring I have gleaned a few particulars regarding the water.

The Missisquoi spring is situated in the state of Vermont, U.S.A., and the water is put up in bottles similar to Carlsbad water bottles.

After some introductory sentences the pamphlet proceeds to inform the reader that "the fact that the Missisquoi spring water is usually tasteless, affords no argument against its mineral ingredients and healing properties; for many of the most deadly poisons are almost without savour, and arsenic is one of them; and as it is well-known of one ingredient that it may be obtained in several allotropic forms in which its physical and chemical attributes are completely changed, so by the blending of some of the numerous compounds contained in this water there may be created an entirely new property." . . . . . "Therefore, while an extended analysis of the Missisquoi spring water, if one could be accurately obtained, might gratify the curious, it would inevitably lead to deception in the announcement of other springs asserted to possess similar properties." . . . . . "Nature has a varied and occult laboratory of her own, and she has doubtless put into the water of the Missisquoi spring just such curative properties and in just such proportions as are necessary to effect the cures intended, irrespective of its apparent chemical preparation." All this reads very nice, but the only effect is to whet the desire to get at the secret of this wonderful water, in the manufacture of which Nature has taken such evident and especial care.

In addition to the specific action in cancer, the water cures scrofula, catarrh, eczema, dropsy, gravel, Bright's disease, syphilis, hæmorrhoids, etc., etc.

The directions for use state that "the usual quantity is one bottle a day." . . . . . "Whenever the case will admit of it the water should be used externally. In this respect the rule is without exception."

The water operates invariably as a diuretic, and although some persons have taken it in very large quantities, upon the supposition that if the usual quantity were good, more of it would be better, yet they have never experienced any ill effects from it.

The remedy has not the vulgar fault of being cheap, because it is expressly stated that it is not to be expected that a "few bottles or a few dozen of them" will eradicate disease from the system, and each bottle must cost the patient about half a crown.

Being desirous of ascertaining if possible this hidden secret, I remarked first the physical characters of the water. The following is a transcript from my notes. The liquid is perfectly clear; taste and odour, none, or only the musty flavour such as belongs to long kept water; specific gravity 1000; residue from 20 fluid ounces, trace. Nitrate of silver gave a faint opalescence, which disappears on addition of ammonia; and baric nitrate, a slight cloudiness which almost entirely disappeared on adding nitric acid.

The specific gravity of the water, the very small residue and the minute traces of chlorides and sulphates, were all such as to clearly indicate that this was not a mineral water in the sense in which we use that term. Not having weighed the first residue this was gone into more fully on a subsequent occasion, and sufficient water evaporated to give what would be a workable quantity of mineral matter. The actual amount of residue proved to be 16 grains per gallon, and this on analysis was found to consist of carbonate of calcium 10 grains, and sulphates of calcium and magnesium 6 grains. The poisonous metals were all absent, and any other metal that might be in the water could only be present in infinitesimal proportions, and such that it could not be detected by the ordinary analytical methods. This analysis satisfied myself as to the correctness of a suspicion which I had entertained some time, viz., that Missisquoi spring water was perfectly destitute of any active medicinal virtue, and was neither more nor less than an ordinary moderately hard, but very pure spring water.

Salts or Saltpetre?

BY THOMAS MABEN.

A friendly grocer sent his lad to me the other day with a sample, and a request that I would say whether this was salts or saltpetre. I forthwith handed the sample to my junior apprentice, and the result of his analysis turned out to be that the chemical in question was nitrate of soda. Having verified the analysis for myself, I made a few inquiries, and learned that this had been bought in the ordinary course as saltpetre, at the cost of 10*s.* per cwt., and was being retailed at 6*d.* per lb. A sample of the nitrate is on the table, and it will be noticed that for commercial sodic nitrate it is an exceptionally pure specimen. There is not the slightest trace of potassium present, and why it should be in the market at all in the hands of wholesale grocers I do not understand.

My object in giving these details is not to comment on the unfair competition to which honest tradesmen—chemists as well as other people—are compelled to submit, nor even to draw attention to the fact that Acts of Parliament have not killed adulteration and substitution.

My purpose is far otherwise, viz., to let this incident, insignificant in itself, it is true, be the occasion for insisting on the absolute need for the pharmacist of these days being thoroughly abreast of his profession, as distinct from his trade. I should say that there are exceedingly few, if any at all, among the younger generation of pharmacists, but could have told at once, and without difficulty, what this particular chemical was, but there are hundreds of cases occurring in the yearly round of our experience which demand the application of knowledge and the exercise of skill, such as no one, not excluding even the medical man, but the thoroughly well-trained pharmacist possesses. I do not refer simply to such questions as the genuineness of the drugs we sell, the purity of the alkaloids,

the strength and quality of the galenicals, though all these are of enormous importance, and few among us give them the really practical attention they deserve, but to other questions that come up continually, problems that only a skilled and qualified pharmacist can settle. When I use the word "qualified" I do not refer simply to the statutory qualification, the hall-mark obtained as the result of a successful passage through the hands of various examiners; I refer to something beyond, and, better even than that, good as that may be. It is not enough that we have got just sufficient knowledge to take us through the Minor or the Major examination; we need more than that. Much of the theoretical information gained in the course of study will be of value to us only in so far as we make it the foundation on which to build thoroughly practical and scientific work, years after we have passed through the examination room. And more than that, it is probable that the experience of many will be that after all, much that has been learned with hard and weary grinding, seems *per se* of very little real practical utility. I grant that this may be so, but it is just one argument which goes to prove that every stage of our life's history brings its new problems, and if at any given stage we fail to grasp the present significance, we drop links in the chain of our experience which can never be renewed at any cost. The poet tells us that—

"Men may rise on stepping-stones
Of their dead selves to higher things."

If we never passed through the embryonic student life, we could have no foothold to start with, and we would never be in a position to make use of other stepping-stones, as they come one by one within our reach.

But *cui bono*? What is the use of all this pother with grocers selling saltpetre at less than what we pay for it, quinine at 3*d.* per drachm, with patents at 9*d.* or 10*d.*, and with limited companies eating up the poor chemist on every side? Simply this; that in the struggle for existence only that man will survive who can show some *raison d'être*. Think you that the public will support the pharmacist in preference to the grocer, if the former cannot establish a claim to confidence which the latter does not possess? Verily, nay.

Apart from all this, one great factor in true success must ever be the *mens conscia recti*, the mind conscious not only of its own integrity, but of its ability and knowledge. Such consciousness gives to its possessor a confidence that reacts on others, and begets confidence in them; and it is to the self-confident pharmacist, who is a vastly different person from the self-conceited pharmacist, that the medical man turns for information as to new remedies, for explanation of decompositions and incompatibilities, for special examinations of urine, and for many other correlated problems that continually arise. For these and other reasons, in the language of parliamentary petitions, I plead for a continuance of study in the real, practical, highest sense, by older men as well as by younger, for only thus will the body pharmaceutical be healthy, vigorous and long-lived.

The Dilution of Cow's Milk in Infant Feeding.

BY THOMAS MABEN.

The article by Dr. Rotch entitled "Observations on the usual methods employed for modifying the albumenoids in Infant Feeding," published in a recent number of the *Pharmaceutical Journal* (March 2, 1889, p. 706), is one of considerable interest, and whether or not the medical profession be found in general agreement with the author, he deserves thanks for his somewhat original treatment of the subject. The results at which he has arrived are, however, open to doubt, and this will be especially apparent if we follow out his own reasoning to its legitimate conclusions. After detailing his experiments on cow's milk, and on mixtures of cow's milk with water, lime water, barley water, milk sugar, Mellin's food, Robinson's barley, etc., etc., with the view to ascertaining how best the coagulum may be broken up, the author says, "We may conclude, then, until something more definite is known concerning this rather theoretical method of treating the albumenoids of milk, that dilution with plain water is the most practical and efficient means at our command;" this dilution to be carried on until the amount of "nitrogenous matters" "corresponds to that found in human milk." Briefly stated, Dr. Rotch's position is this. He has observed that children fed with cow's milk, and also children fed at the breast, frequently vomit larger or smaller quantities of curd, which he correctly attributes to the excess of albumenoids in the milk, and his experiments lead him to conclude that neither alkaline diluents, such as lime water, nor cereal attenuants, such as the various foods, succeed in preventing the formation of the clot, or curd, but that all that is required is dilution with plain water to the extent already mentioned.

Before going further I wish to draw particular attention to Dr. Rotch's analyses of human milk, for while I do not say they are inaccurate, I have no hesitation in affirming that they are quite abnormal, so much so as to be valueless as bases for any comparative statements. This will be at once apparent, if I tabulate the figures relating to the fat, albumenoids and ash. The milk was that of a healthy wet nurse, fed (I.) on "plain but good food," (II.) rich food with "very rich milk," and (III.) plain food and skimmed milk. The percentages of fat, albumenoids and ash in the milk obtained from each of these diets are said to be as follows:—

	I.	II.	III.
Fat	0·72	5·44	5·50
Albumenoids . .	2·53	4·61	2·90
Ash	0·22	0·20	0·14.

There are several anomalous features in this table, the very first figure being so extraordinary that I cannot account for it save on the hypothesis of experimental error. In Professor Leeds' elaborate paper on the "Analysis and Composition of Human Milk,"* we have a table of the analyses of eighty samples, and it is worthy of note that the minimum percentage of fat of the entire series was 2·11, or three times higher than Dr. Roch's, while the average was 4·131. Other analysts give an average of over 3 per cent. as the figure for fat, but Professor Leed's valuable monograph may be regarded as definitely settling the question as to the composition of human milk, consequently his averages will be taken as the standard. It will thus be seen that 0·72 per cent. of fat is a figure, which if accurate is so utterly abnormal as to be worthless. The difference in the percentages of fat in I. and II. is explained by the change of diet from plain food to rich food, but what will puzzle most people to elucidate, is why the fat should go on increasing even after the nurse had been reduced from rich feeding and very rich milk, to plain food and skimmed milk. This is what is hardly conceivable, and what on *a priori* grounds would certainly not have been expected. The same line of remark applies to the albumenoids. There is no reason why No. II. should be higher than No. III., because, as a matter of fact, the percentage of albumenoids in skimmed milk is greater than in unskimmed, and there is not the slightest reason why plain food should not have as large a proportion of albumenoids as rich food. Lastly, it is difficult to understand why the ash should have fallen 33 per cent. Professor Leeds' average of ash is ·201, this figure approximating to that observed by other analysts.

* *Pharm. Journ.* [3], xv., p. 576.

I have drawn your attention to these anomalies, as they appear to me, in order that you may understand why I select Professor Leeds' averages rather than Dr. Rotch's figures as the basis of what follows.

Alongside of Leeds' figures I tabulate the composition of cow's milk, as found from the mean of a large number of published analyses.

	Human milk.	Cow's milk.
Albumenoids	1·995	4·77
Milk sugar	6·936	4·45
Fat	4·131	3·46
Ash	0·201	0·70
Total per cent.	13·263	13·38.

We are now in a position to consider what will be the effect of "dilution with plain water," until the amount of nitrogenous matters "corresponds to that found in human milk." Cow's milk is as nearly as possible 2·4 times stronger in albumenoids than human milk, so that every pint of cow's milk must be diluted with water to 48 fluid ounces before it arrives at the proper degree of dilution. It is calculated that a healthy child on an average drinks each twenty-four hours 3 pints of mother's milk, which contains 8 ounces of total solids, while an equal quantity of the diluted cow's milk contains only $3\frac{1}{3}$ ounces total solids, as the following tables show:—

	3 pints human milk.	3 pints diluted cow's milk.
Albumenoids	1·2	1·2
Milk sugar	4·2	1·1
Fat	2·5	0·87
Ash	0·12	0·17
Total in ounces	8·02	3·34.

From these figures it will be quite apparent that if Dr. Rotch's recommendation be carried out to its logical conclusion, one of two results must follow; either the child will be half starved, and this is most likely to be the case, or its poor *corpus vile* will be made into a cistern through which a continuous stream of water will be passing. For you will notice that the average child will get from mother's milk, in round numbers, $1\frac{1}{4}$ ounce of albumenoids and $6\frac{3}{4}$ ounces of fat-forming and heat-producing constituents per twenty-four hours, while from the same quantity of diluted cow's milk he would get only 2 ounces of carbohydrates. This amount is totally insufficient to nourish any child, and the result would be that the poor victim would require to drink as much as 10 pints of milk and water (especially water) before the average could be reached. I agree entirely with what is said as to the mistake of using milk too rich in albumenoids, but to go to the opposite extreme of dilution without some suitable compensation is an even greater mistake. But there is a *via media*, which, if not a golden mean, is at least a safe compromise; there are indeed numerous *viæ mediæ*, any one of which can be adopted with the greatest success. It is admitted that the addition of fats to artificial food in the case of children is a mistake, so that we must fall back on milk sugar, or cane sugar, or one of the numerous non-farinaceous foods, or even on condensed milk, any one of which can be so prepared with or without cow's milk that with healthy children regurgitation of curdled food will be absolutely unknown.

The Chairman said they were much indebted to Mr. Maben for these interesting and racy notes, but at the late hour they could hardly enter on a full discussion of them. Mr. Maben was an authority on the subject dealt with in the last note, and his criticism of Dr. Rotch's communication was worthy of attention.

Mr. Maclaren said the sale of nitrate of soda as saltpetre had been noticed as long ago as 1870, and it was well known as a substitute for nitrate of potassium. It could be correctly called saltpetre, and he did not know that its sale as such could be legally interfered with.

Mr. Thomson then showed specimens of green euonymin, giving a practical demonstration of the difference between the green colouring matter of the samples, and extract of Indian hemp. He also read the following:—

Note on Green Euonymin.

BY ISAAC W. THOMSON.

You will most probably have observed an analysis of green euonymin published in last week's *Chemist and Druggist* by Mr. Collins, in which he states that the sample contained a resin chiefly consisting of extract of Indian hemp. As such a statement is calculated to cause a considerable amount of uneasiness in the minds of chemists, I have thought it well to give, in this short note, the results of a recent examination of four samples. Three of these were of such a character as to excite suspicion; the other was a very old sample which I had lying by me. Specimens of these are on the table.

No. 1 is the old sample. It is of a brown colour, and to appearance seems destitute of green colouring matter. Under the microscope it appears of a homogeneous nature.

Nos. 2, 3 and 4 are recent samples, and their oily look excited some suspicion. No. 2 is of a dark olive green colour, and 3 and 4 of a light olive green. Under the microscope they are seen to consist of a mixture of several substances, as may be seen from the specimen on the table.

A portion of each was exhausted with spirit (density ·835) with the following results:—

No. 1 yielded 20 per cent. extract.
„ 2 „ 36 „ „ „
„ 3 „ 30 „ „ „
„ 4 „ 30 „ „ „

I have here a specimen of the extract yielded by the three latter samples. No. 1 extract was unfortunately destroyed before I thought of making this communication. It contained sufficient green colouring matter to indicate its original character.

The four residues left after treatment with spirit were boiled with water. No. 1 dissolved entirely, and the solution on evaporation yielded an extract of a gummy nature. Nos. 2, 3 and 4 partially dissolved, and the solution on evaporation yielded crystals of which there is a specimen on the table. These proved to be sugar of milk, and an estimation indicated that the samples contained from 26 to 30 per cent. The residue insoluble in water, amounting to about 30 per cent., was examined microscopically, and found to be almost pure lycopodium. I have placed a specimen under one of the microscopes on the table.

A portion of each sample was then ignited and the ash examined with the following results:—

No. 1 yielded 10 per cent., chiefly alumina.
„ 2 „ 5 „ „ phosphate of lime with iron.
„ 3 „ 4 „ „ „ „ „ „
„ 4 „ 3 „ „ „ „ „ „

An alcoholic tincture of each sample was made, each representing an equivalent quantity of spirituous extract. A tincture of Indian hemp of corresponding strength was also prepared, and an equal quantity of each tincture was added to 10 fluid ounces of water. The euonymin tinctures gave off a very characteristic tea-like odour, contrasting very decidedly with the harsh characteristic odour of Indian hemp. When mixed in equal proportions the Indian hemp entirely conceals the delicate aroma of the euonymin, and even when mixed in the proportion of 1 part Indian hemp to 2 parts euonymin, the heavy odour of the former still distinctly predominates.

From the foregoing results I am disposed to conclude that No. 1 was prepared by first exhausting the bark

with strong spirit, and then with weak spirit, mixing the two tinctures and precipitating with alum. Nos. 2, 3 and 4 are samples of true euonymin, mixed with lycopodium and sugar of milk as diluents, and coloured with some green colouring matter, using oil as a medium.

I can scarcely conceive that any firm would lend themselves to the adulteration of such an article as euonymin with extract of Indian hemp. In the sample examined by Mr. Collins it must either have got in by mistake, or some unscrupulous person has been trying his hand at an imitation, or there has been some mistake in the identification of the resin.

Mr. Hill said he had had some experience of a specimen of euonymin apparently very similar to that examined by Mr. Collins. This specimen was shown at a recent meeting by Mr. Bennet, who reported that it contained lycopodium, fixed oil, and a green colouring matter, the nature of which he had not determined. The specimen having been left in his (Mr. Hill's) hands he had examined it more fully. By a curious coincidence he had also suspected that the colour was due to extract of Indian hemp. He had been first led to suspect this from the peculiar odour of the green oily extract obtained by exhausting the euonymin with ether. On comparing the two more closely, however, he was led to doubt his first conclusion. A tincture of Indian hemp is of an olive green colour, whereas a tincture of the euonymin is of a decided bluish-green colour, and the odour, though there is a faint resemblance, is quite distinct. To test the point Dr. Stockman had very kindly subjected the sample to a physiological test. Upwards of 15 grains were administered to a rabbit without producing any symptom of Indian hemp poisoning, and this was regarded as conclusive proof that no extract of Indian hemp was present. On carefully examining a little of the sample microscopically it was found to contain lycopodium, broken crystals of sugar of milk, and brown yellow and deep indigo blue particles. The latter were probably the black particles referred to by Mr. Collins, as they appear black at first, but if carefully examined, and especially when smashed up under the microscope they are seen to be deep blue. As to what the colouring matter was he was unable as yet to say. He showed a specimen of chlorophyll prepared that day. It was of an olive green tint, and wanted the peculiar bluish colour which was well seen in the sample of euonymin extract on the table. He had prepared a tincture of the green *euonymus* twig bark from which green euonymin was said to be obtained. It would be seen that the tincture was of an olive-green colour and the resin precipitated from it was also olive-green, while the resin precipitated from the sample of euonymin was distinctly blue-green. Whatever the colour might be, therefore, he thought it was added. He believed a preparation of chlorophyll, containing a little copper, was sold for colouring purposes, but he had failed to find copper in the sample. The sample shown was sent out by an American manufacturer, who, he was informed, made it no longer.

Mr. Gibson said he had had some practical experience in the preparation of these resinoids, and they could not be prepared in a suitable form without the addition of some inert substance which was intimately mixed with the extract. This, he thought, explained the presence of lime in the samples. The green colouring matter he thought was chlorophyll.

The Chairman said he had had considerable experience in working with chlorophyll, and he doubted very much if it was the colouring agent in these samples. Chlorophyll was of a dull olive-green colour and had not the blue tint so characteristic of this tincture shown by Mr. Hill. This timely note would put them on their guard as to the varieties of green euonymin in the market.

On the motion of the Chairman, cordial votes of thanks were awarded to the authors.

Attention was then directed to the following additions to the Museum:—

Antifebrin, cinchonidine camphorate, cinchoninate of copper, quinidine benzoate, quinine anethol, quinine anisate and clove stalks.
From the MUSEUM, 17, Bloomsbury Square, London.

Two Bael fruits. From Mr. J. T. COATS, Leith.

Thanks having been awarded to the latter, the meeting was closed.

Pharmaceutical Society of Ireland.

The following is a copy of the reply of the Council to Dr. Duffey's Report to the Privy Council on the examinations held during 1888 (see *Pharmaceutical Journal*, January 12, p. 559):—

[*Copy.*]

"11, Harcourt Street, Dublin.

"13th *March*, 1889.

"Sir,—In reply to your letter of December 27 last, I am directed by the President and Council of the Pharmaceutical Society of Ireland to state, for the information of his excellency the Lord Lieutenant in Council, that my Council has had under consideration the report of Dr. G. F. Duffey, the inspector appointed to visit the examinations of the Society, dated December 15, 1888; and I am to make the following observations thereon:—

"(1) My Council is pleased to note that its efforts to improve the efficiency of the examinations, and its willingness to adopt the suggestions of the Visitor, have received full acknowledgment.

"(2) My Council fully appreciates the inconveniences caused by the limited space at its disposal, and has determined upon obtaining larger and more suitable premises at the earliest possible date.

"(3) With reference to the Preliminary examination, and in confirmation of the Visitor's report, my Council is quite alive to the very superficial knowledge shown by the average candidate. Instructions have been given to the examiner, to set a written paper in Latin, in addition to the *vivâ voce* examination to which candidates have hitherto been subjected. The possibility of passing candidates on insufficient answering in botany, chemistry and physics is removed by the adoption of minimum marks in all subjects (Order of April 18, 1888); to which the attention of the examiner has been drawn.

"(4) The Visitor's remarks upon the examination in practical pharmacy have received due attention, and arrangements will be made to extend the supply of *preparations* available for this portion of the examination; as has already been done with regard to the specimens of drugs for the use of the Materia Medica Examiner.

"I am to point out that the financial resources of the Council are limited; and that it is only by degrees that it can supply all the necessary appliances, and that during the past three years great advances have been made in this respect.

"(5) With reference to Dr. Duffey's suggestion that candidates should be examined as to their knowledge of the 'Poisons Act (Ireland),' I am to point out that, while my Council approves of the suggestion, it has no power to extend the examination beyond the subjects laid down in Sec. 21 of the 'Pharmacy Act (Ireland) 1875.'

"I have the honour to be, Sir,

"Your obedient Servant,

"ARTHUR T. FERRALL, *Registrar*.

"Sir W. S. B. Kaye, C.B., etc., Clerk to the Council,
"Dublin Castle."

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

Origin and Distribution of the British Flora.

BY W. A. SALTER,
Pharmaceutical Chemist.

(*Concluded from page* 760).

One or two of the Scotch mountains are specially noted to botanists as furnishing a home to several rare species. One such is Ben Lawers, in Perthshire. Its summit is the only British locality for *Saxifraga cernua*; the little plant, owing to the rigour of the climate, seldom has an opportunity of flowering, but propagates itself by tiny bulbils produced in the axils of the leaves. It was feared that there was much danger of this interesting species becoming extinct, owing to the ravages of too eager collectors, but within the last year or two it has been reported as considerably more abundant than formerly. Here also occurs the snowy gentian (*Gentiana nivalis*); it is the smallest of alpine plants, not above an inch in height, with a tiny deep-blue flower. Another mountain, called the Sow of Athol, situate in the extreme north of the same county, is remarkable as having been the site of the great Caledonian pine forest. A small remnant of this still exists, many of the trees being very old and of large size. This wood is the only habitat in Britain of a large number of insects, chiefly Scandinavian in their character, of great interest to entomologists. The two most eagerly sought for plants of the neighbourhood are *Menziezia cærulea* and *Azalea procumbens*. The former is a rare and beautiful heath with large blue bells. It is named after Menzies, a botanist who explored many of the Highland districts during the last century, when they were practically an unknown and almost inaccessible region. The tiny trailing azalea has crimson flowers, and is a connection of the showy rhododendrons of our shrubberies. It has a bad reputation as being injurious to sheep and goats feeding upon its young shoots, just as another species of azalea furnishes the poisonous principle to honey produced near Trebizond, in Asia Minor, the partaking of which caused the suffering of the Greeks during the retreat of the ten thousand.

The Alpine plants form a distinct class amongst the British flora, numbering about 100 species. We will conclude our survey of them with a quotation from Macmillan:—"How suggestive of marvellous reflection is the thought that these flowers, so fragile that the least rude breath of wind might break them, and so delicate that they fade with the first scorching heat of August, have existed in their lonely and isolated situations on the Highland hills from a time so remote that, in comparison with it, the antiquity of recorded time is but as yesterday; have survived all the vast cosmical changes which elevated them, along with the hills upon which they grew, to the clouds—converted the bed of a mighty ocean into a fertile continent, peopled it with new races of plants and animals, and prepared a scene for the habitation of man! Only a few hundred individual plants of each species—in some instances only a few tufts here and there—are to be found on the different mountains; and yet these little colonies, prevented by barriers of climate and soil from spreading themselves beyond their native spots, have gone on season after season for thousands of ages, renewing their foliage and putting forth their blossoms, though beaten by the storms, scorched by the sunshine, and buried by the Alpine snows, scatheless and vigorous, while all else was changing around. It is one of the most striking and convincing examples within the whole range of natural history, of the permanency of species!"

Whilst the Arctic species were retreating before the more genial climate which succeeded the glacial period, other forms from the continent of Europe hastened to occupy the ground thus left vacant. It is the invasion which now took place that has given us by far the greater number of our existing plants. The new arrivals fall into two tolerably distinct groups, which entered the country respectively on the north-east and south-west sides, and have been called plants of the Germanic and of the French types. The former class is much the larger and more important; its members generally range all over central and western Europe. To it belong many of those forms which cover large tracts of country, such as the heather, the furze, and most of our herbaceous plants, shrubs and trees. Some have spread no further than the eastern counties of England; examples are found in two local plants, the crested cow wheat (*Melampyrum cristatum*), and *Medicago sylvestris*. One of the rarities of the group is the May lily (*Maianthemum Convallaria*), a member of the same sub-order as the lily of the valley. Its only British locality is about five miles inland from Scarborough, and it is there confined to a small area on a hill-side which shuts in the end of a long valley extending down to the sea. It is a common species in Germany and Norway.

The plants of the French type occur only in a few of the south-western counties, and we may find them again in southern Wales and Ireland, whilst they are very characteristic of the Channel Islands. Examples are to be found in the Cornish and ciliated heaths (*Erica vagans* and *E. ciliaris*), which grow in Cornwall and Dorset as well as in western France. Two very local species are the little crocus-like *Romulea Columnæ*, only found in Britain at Dawlish in Devonshire, and the acrid lobelia (*Lobelia urens*), which grows on a common near Axminster in the same county.

We now pass to the last and smallest, but by no means the least interesting, group of indigenous plants. This is a cluster of species of distinctly Spanish type, which occur with us only in the south-west of Ireland, and are found most abundantly on the Pyrenees and in the province of Asturias. They are about twenty in number and include six saxifrages, one of which is *Saxifraga umbrosa*, or St. Patrick's cabbage, better known as the London pride of town gardens. Two heaths are also members of the group—the Mediterranean (*Erica carnea*), and St. Dabeoc's (*Menziesia polifolia*); the latter resembles the Scotch menziesia, but its flowers are pink instead of blue. The so-called strawberry tree of Killarney (*Arbutus unedo*) is another species worthy of mention; it was at one time thought to have been introduced by the monks of Mulross Abbey. Its fruit, though brightly coloured and attractive in appearance, is dry and tasteless. Associated with the plants we have been speaking of occur two which have a different geographical range entirely, as they abound in North America, but in Europe are found only in this corner of Ireland. One is the *Spiranthes Romazoviana*, a small orchis found only near Bantry Bay, and the other is the blue-eyed grass (*Sisyrinchium angustifolium*), belonging to the order Iridaceæ. A considerable difference of opinion exists as to the derivation of the Spanish plants. The supporters of one view hold that they are survivals from pre-glacial times of the flora of the continent of Atlantis, which disappeared during the ice age, and that they were able to withstand the cold period which exterminated them in Great Britain upon the hill-tops of southern Ireland, owing to the exceptionally mild climate of the latter district. If this surmise be correct they are the most ancient of all our existing species. The other theory imagines that the members of this group travelled northwards from Spain by the ordinary methods of plant dispersal, when land con-

nection with the continent was again established towards the close of the glacial period. The principal objections to this view are, firstly, the fact that none of the Spanish composites have accompanied the saxifrages and heaths, though provided with better means of dispersal; and, secondly, we have good evidence that the union with the continent was of too short duration to allow of migration from such a long distance taking place. This evidence rests chiefly on a comparison of the fauna and flora of the British Islands with those of the continent. The species on both sides of the Channel, as we have before noticed, are practically identical, but much fewer in number on our own. Thus Germany possesses about ninety land mammals and Scandinavia sixty, while Great Britain has forty and Ireland only twenty-two. Again, out of twenty-two species of German reptiles and amphibia thirteen reached England and only four the sister island. Hence it will be seen that the absence of snakes and toads in the Emerald Isle can be otherwise accounted for than by the tradition which ascribes it to their banishment by St. Patrick. Turning to the vegetable kingdom we find that Ireland possesses almost exactly two-thirds the number of flowering plants and ferns which exist in England, Scotland and Wales. The foregoing facts point to a comparatively short time after the glacial period for restocking our country with species before the final separation from the mainland took place, many continental forms not reaching England at all. The still greater poverty of Ireland in species is explained when we notice that it must have been severed from England while the latter was still joined to the continent, for the Irish Sea is deeper than the English Channel. This disruption has been described as "Ireland's first and greatest grievance," and but for its occurrence it is highly probable that the perennial Irish question which is now so prominent would never have sprung into existence. The change which brought our islands down to their present size appears to have been brought about by gradual sinking of the land, a direct proof of which is furnished by the submerged forests existing in many places round the coast.

Of truly indigenous or native plants, *i.e.*, those which have not been introduced by the agency of man, but two remain to be mentioned. They are the slender naiad (*Naias flexilis*), and the curious jointed pipewort (*Eriocaulon septangulare*), which are found in the lakes of Skye and Coll, and again in Connemara, but not elsewhere in Europe. They are American plants, either like the two land plants which were mentioned relics of sunken Atlantis, or more probably they have been brought by the Gulf Stream, which traverses the American coast for a long distance before taking its tremendous sweep across the Atlantic. This surmise is not at all improbable, as the huge ocean current frequently brings with it the seeds of tropical plants, and the leguminous fruits of two or three West Indian trees are washed up on our western coasts, and even carried by it to Iceland, Norway and Spitzbergen.

Besides the aboriginal plant occupants of Britain, a great number have been introduced by the agency of man either purposely or otherwise, and this process is still going on. Sir J. Hooker remarks that annual plants are quite rare in undisturbed soil, and depend almost entirely on cultivation. Thus in the west of Scotland many weeds, common elsewhere, are entirely confined to the neighbourhood of cottages. This does not appear to be due to the presence of nitrogenous matter in the soil in such localities, as the weeds require no more than other plants, but simply to the fact that all available ground is already occupied by the sturdy native perennials, and the weak annuals have no chance to seize upon the ground except where it has been artificially cleared. Hence it is quite possible that such now universal weeds as the red poppy and corn cockle may have gained no footing in the country till the primitive inhabitants commenced to roughly break up and till the ground. At the present time many foreign weeds spring up in cultivated lands, their seeds having been imported with the grain or other crop which has been sown, and a few of these become permanently naturalized. *Veronica Buxbaumii*, a native of south Europe and central Asia, is supposed to have been introduced with clover seed, and first appeared in England in 1829; it is now a very common cornfield weed. The crusaders brought back with them from the east many fruit trees and some medicinal plants with whose virtues they had become acquainted. *Datura Stramonium*, a native of Abyssinia and the East Indies, was spread all over Europe by the agency of gipsy quacks, and it is also now common in the United States. Ships or barges carrying earth and stones as ballast are frequently the means of introducing new species. Thus *Orchis laxiflora*, a continental species, found also in the Channel Islands, occurs upon ballast heaps at Hartlepool; and I have found *Silene italica*, a South European plant, growing in a similar situation beside the river at Ware. The evening primrose (*Œnothera biennis*) was originally introduced in the same way, and is now spreading all over Europe. Foreign seeds again are often imported with wool; near Galashiels, where wool-dressing is carried on, over forty species of plants have been found, the majority of which do not occur elsewhere in Scotland, and some are entire strangers to this country. Another class of casual introductions consists of escapes from gardens. These occur frequently in a more or less wild state; common ones are the red valerian (*Centranthus ruber*), and the lesser periwinkle (*Vinca minor*), both natives of the Mediterranean region. The Canada thistle (*Erigeron canadensis*) spread over the whole of Eastern Europe about a century ago from some specimens grown in the Jardin des Plantes at Paris. The yellow mimulus (*Mimulus luteus*), also an American species, was introduced into gardens in 1825, and is now found apparently wild in many localities in Britain and on the continent. It grows abundantly in the river Lea at Hertford. The American waterweed (*Elodea canadensis*) was first recorded in England in 1847, and is now almost the commonest growth in our canals and rivers, in some cases seriously impeding navigation. This species is diœcious and the female plant only has reached Europe. It is, however, readily propagated by its axillary buds, and probably owes its rapid dissemination to the agency of water-fowl. Quite recently a Chilian plant (*Galinsoga parviflora*) has become naturalized at Kew and Richmond, having escaped from the Botanical Gardens. The hoary cress (*Lepidium draba*) was brought in 1809 by the returning troops from the Walcherean expedition. The soldiers landed at Ramsgate, and the straw from their mattresses was thrown into an old chalk pit belonging to a Mr. Thompson. This plant has sprung up and has become a troublesome weed in the Isle of Thanet, where it was long known to the farmers as "Thompson's weed." Altogether it is believed that sixty-four perfectly naturalized species have been unintentionally introduced by man during historical periods.

On the other hand by altering the conditions of existence, man is quite as frequently instrumental in exterminating species. In Middlesex it is estimated that 58 out of 859 plants formerly recorded have disappeared. A curious instance is the yellow-rocket (*Sisymbrium Iris*), which, though previously unknown, sprang up on the ruined walls of London after the Great Fire of 1666; it is not now found in the near neighbourhood of the metropolis. In a book published about twenty-five years ago I find a statement that neither smoke nor contamination of the river had then succeeded in driving the arrowhead (*Sagittaria*

sagittifolia) out of the Thames, large beds of it existing opposite the Temple Gardens and Hungerford Market. It would be interesting to know whether these are still extant. Within the last few weeks I notice a statement by Professor Hillhouse that a colony of black-headed gulls having settled down on the moor of Methuen near Perth has caused the extinction of *Scheuchzeria palustris*, a rush-like plant only found in two or three other localities in Britain. It is to be feared that plant collectors are not altogether guiltless of hastening the exit of some rarities which long lingered, perhaps, in a single spot. Great ravages have been committed in this way upon some of the Alpine species. We have seen what interesting histories are connected with many of these rare plants, and how some of them are possessed of the bluest blood, so to speak, of any which inhabit Britain, and I imagine that none of us would care to earn an evil notoriety in the botanical world by destroying the last specimen of the race. As Macmillan says: "After having survived all the storms and vicissitudes of countless ages, historical and geological, to perish at last under the spud of the botanist, were as miserable an anti-climax in its way as the end of the soldier who has gone through all the dangers of the Peninsular war, and was killed by a cab in the streets of London."

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At the conclusion of the paper—

The President said the Association was much indebted to Mr. Salter for this interesting dip into the phase of botany which was least known to pharmacists. With regard to the question of fossil botany it struck him as being remarkable that in the clay which formed the basin of London, fossils were found at all depths, from one to 600 feet, while the Paris basin should be calcareous, and contain hardly any fossils but diatoms, etc. The period of extreme heat which the world had passed through was not, he thought, satisfactorily explained. If, as said, it was due to variations in the distance of the sun, it seemed to him that these variations, to produce such marked changes, would have to be so great as to quite upset the solar system; but perhaps the presence of tropical plants here at an earlier period might be accounted for by their having been carried from some—then adjacent—spice islands. Mr. Salter's paper showed how Darwin's theories were more and more gaining ground, though of course the difficulties of proof were immense. He should like to ask Mr. Salter whether he had heard of the statement that the seed of *Avenus sativa* under certain conditions could be made to yield a crop of rye? The question seemed ridiculous, but he heard it so often stated that he should like to ask Mr. Salter's opinion.

Mr. T. S. Dymond had listened with much interest to Mr. Salter's valuable paper, although some statements seemed to him to require further explanation. For instance, Mr. Salter had said that the sea pink existed only at the sea-shore and on the mountain top, but it must also at one time have covered the side of the mountain, or how was its presence at the summit to be explained? With regard to the occurrence of plants on widely separated localities (in England and America, for example) the explanation given was that continents had once existed where the sea now stood, and that the plants had travelled over these then existing continents; but when they considered the immense time that the glacial epochs lasted, such a process as this seemed incredible. He was afraid that many great geologists were apt to be carried away by the romance of their subject, and to accept shallow evidence as proof.

Mr. W. L. Williams said that the history of plants as seen in their fossils must necessarily be incomplete, owing to the structure of plants. Vascular and cellular tissue was so easily destroyed that few perfect fossils of the softer parts of plants were to be found. The most perfect fossils were the diatoms and the parts of the plant having a woody structure. It was remarkable that in Madagascar the flora was different from that of Africa, notwithstanding the comparative narrowness of the Mozambique channel. He did not follow Mr. Dymond's remark as to the necessity for the sea pink having covered the side of the mountain, for when the mountain was submerged its summit would then fulfil all the conditions of an island, and be a suitable ground upon which the sea pink might flourish.

Mr. F. Alfred Rogers said that such a subject as this required handling by experts, such a mass of facts had to be accumulated before an opinion could be formed; when geologists differed, as they did, who should decide? He must congratulate Mr. Salter on the excellent way in which he had attempted to balance the conflicting opinions and decided between them. He should like to ask Mr. Salter if he could tell him what fossils of plants were found only in serpentine formations, as it was in that formation only that asbestos was found, and such knowledge might help in clearing up the mystery as to the formation of asbestos. If plants were there it was remarkable when they considered the great heat which had been necessary to fuse the asbestos.

Mr. Salter, in reply to Mr. Millard, said that it was probable that the tropical remains found in this country had been brought here by streams like the Gulf Stream, although the great quantity found seemed to negative this view, and moreover bones of tropical animals were found with the vegetable deposits. He did not think any faith could be placed as to the capability of oats under any circumstances to produce rye. He took it that seeds always produced the parent type. With regard to Mr. Dymond's remark as to the occurrence of the same plants in England and America it was thus explained. At one time all these plants grew in the north polar region (in the continuous land surrounding the north pole); as the cold periods came the plants were driven southwards to America, Lapland and Scandinavia, reaching then Denmark, Germany, and finally England, so that we need not imagine "Atlantis" for these. The occurrence of the same plants on different sides of the Equator had been found difficult of explanation, but was now explained by the assumption of the existence of what were called "interglacial periods," during which the plants were able to cross the Equator. As to the sea pink, Mr. Williams's explanation was no doubt correct; a mountain top much resembled an island or coast, and the sea pink was found on most mountain tops in Scotland but not in England, the soil being apparently not suitable. In reply to Mr. Rogers, "the Cornish heath," *Erica vagans*, had been found growing in serpentine rocks. Such formation, he believed, contained no fossils, like all igneous rocks.

A vote of thanks being accorded to Mr. Salter for his valuable paper, the proceedings terminated.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, March 14, Mr. W. L. Williams, Vice-President, in the chair. The following paper was first read:—

Preparation of Aloin.

BY T. WOODRUFF.

The preparation of this crystalline principle from the various species of aloes has been the subject of repeated investigation, as a glance at the indices of the numerous journals connected with pharmacy will at once render evident.

Several processes have been recommended, the most

common of which is as follows:—The aloes are exhausted with 7 or 8 parts of boiling water, slightly acidulated with hydrochloric acid, the mixture is allowed to stand for twenty-four hours, filtered and set aside for a day or two; the resulting mass is then put into a calico bag and the liquid squeezed out, the expressed liquid on evaporation and standing yielding crystals which can be purified by pressure between folds of filter paper and subsequent recrystallization from alcohol. With Barbadoes aloes this process gives a fair result, but the same cannot be said of socotrine aloes. I have myself tried this process, using socotrine aloes, and have come to the conclusion, already arrived at by many others, that crystals of socaloin cannot be thus obtained, at least on the small scale. Natal aloes were also treated in a similar manner, but with unsatisfactory results.

In the 'Pharmacographia' it is stated that nataloin can readily be prepared in the crude state by triturating the drug with an equal weight of spirit of wine at a temperature not exceeding 48° C.; the amorphous portion is thereby dissolved, and the remaining crystals are collected on a filter, and washed with a small quantity of cold spirit. From 16 to 25 per cent. of this crude nataloin is said to be thus obtained. With the object of finding some satisfactory process by which a good yield of crystalline aloin could be obtained from any of the kinds of aloes, the following experiments were undertaken. Before recording these it might be advantageous to state the difficulties which must be overcome in order to attain the above object. The first of these is the separation of the aloin from the resinous matter with which it is associated in the aloes. The second arises from the fact, that if during extraction in the ordinary way, that is with free access of air, the temperature should become too high, decomposition of some aloin takes place. It has been found that the change is not so easily brought about in acidulated solutions as in those which are neutral or alkaline. The above facts being borne in mind it seemed desirable to try the effect of solvents on different species of aloes, in the hope of finding one which would dissolve the aloin and leave the resin, or *vice versa*. Accordingly separate quantities of Barbadoes aloes in powder were treated with chloroform, ether, benzene, bisulphide of carbon, and amylic alcohol. The last mentioned solvent proved to be the best, for on digesting the aloes with the warm liquid, the aloin was readily removed and deposited again as it cooled. The proportions used were:—Barbadoes aloes 1 part, amylic alcohol 3 or 4 parts. The temperature employed was about 90° C. The insoluble portion which remained was separated by straining through calico; as the strained liquid cooled a bright yellow amorphous powder was thrown down; this was collected and freed as far as possible from adhering amylic alcohol by pressure and drying. On treatment with water and gently warming a small quantity of insoluble matter remained. The clear liquid yielded aloin in acicular crystals on spontaneous evaporation. The yield, however, was not satisfactory.

Socotrine aloes was next experimented upon, using a slight modification of the above process. It was thought that if a larger quantity of solvent were employed the precipitation on cooling might not be so rapid, and that the aloin might therefore separate in crystals. This proved to be the case. Twenty grams of socotrine aloes was exhausted with three or four successive quantities of amylic alcohol, using in all 150 cubic centimetres. The clear liquid was cooled, when a small quantity of resinous matter was deposited; on filtering and setting aside the filtrate for twenty-four hours crops of radiating crystals of socaloin separated. Those which deposited on the sides of the vessel were perfectly free from resin, whilst those formed on the bottom of the vessel were contaminated with resinous matter which had further deposited. The liquid was left for some time, when more crystals were obtained. Owing, however, to the high boiling point of amylic alcohol, the evaporation, even under reduced pressure, was very slow, and as my time was limited, the following course was adopted:—The pure crystals first formed were dried and weighed, the liquid was evaporated to dryness over a water-bath, and the residue extracted with water; the aqueous solution was evaporated to dryness and the residue weighed. This weight being added to that of the crystals, the whole taken as aloin represented a yield of 9 per cent. Another method was then tried:—20 grams of Barbadoes aloes was boiled with about 40 cubic centimetres of amylic alcohol in a flask connected with a vertical condensing tube, with the twofold object of preventing access of air during digestion and preventing evaporation of the solvent. A quantity of resinous matter adhered to the sides of the flask; the liquid was decanted from this into a beaker, and on cooling it became solid. It was found that the originally amorphous mass became crystalline on standing, so that after three days the greater half seemed to be made up of crystals. In order to remove the resinous matter percolation with ether was resorted to, barbaloin being practically insoluble in ether. The residual crude barbaloin was dried and weighed, and represented a yield of 62 per cent.

A fraction of the product before percolation with ether was treated with water, and another with spirit of wine, and in each case acicular crystals were obtained on evaporation. It might here be noted that the crystals were more readily deposited from the alcoholic solution, but were not so large as those which after a time deposited from the aqueous solution. Socotrine and Natal aloes were submitted to the above process, substituting bisulphide of carbon for ether, and finally removing the bisulphide by washing with benzene. Bisulphide of carbon was found to dissolve the resinous matter more readily than benzene, but certain difficulties arose when it came to be evaporated, moisture being condensed by the evaporation of the bisulphide and the crystalline mass becoming more amorphous. Benzene, on the contrary, presented no such difficulties, hence the reason for the final washing with benzene. Two specimens of aloes, kindly given to me by Mr. Holmes, yielded aloins by the above process. One of the specimens is sold in commerce as socotrine aloes, but on testing it gave the reactions for barbaloin; it is believed by Mr. Holmes to be prepared on the East African Coast from a variety of *A. vulgaris*. The odour which it possessed was very similar to that of Barbadoes aloes. The other specimen, bearing the name of hepatic aloes, contained in its substance a number of the leaves of *Calotropis gigantea* (Asclepiadaceæ), and, as might be expected, this specimen corresponded to the tests for socaloin.

Instead of using boiling amylic alcohol, as stated above, I have since found it preferable to employ the temperature of a water bath for extraction. The advantages are (1) that less resinous matter is dissolved; (2) the clear liquid can be poured off more easily from the insoluble matter which adheres to the sides of the vessel; (3) the amorphous mass, being less contaminated with resin, more readily assumes the crystalline form. Some specimens of aloes were also exhausted in an extraction apparatus, when the results varied with the species of aloe used. In the case of Barbadoes aloes, the residual resin was so fusible that it passed through the percolator together with the liquid. When socotrine and Natal aloes were used, this was not the case: but on the contrary a hard resinous coating formed in the percolator, and prevented the liquid from passing through. Although this method of exhaustion was not satisfactory, yet it showed how the properties of the resin contained in the three kinds

of aloes above mentioned, differed from each other. In one case the insoluble matter which remained after treatment with amylic alcohol was examined. It was readily soluble in alkalies, and reprecipitated by acids. To obtain the pure aloins from the crude products, it is best to exhaust with cold water, as the resinous matter is also dissolved by hot. On filtering, and allowing the filtrate to evaporate spontaneously, the crystals separate quite pure.

The paper was illustrated by specimens of crude aloins obtained by the process given, as well as by microscope slides of the crystals, and was followed by a discussion, in which the Chairman, Messrs. Holmes, Browne and Short took part.

Mr. L. W. Hawkins then gave the following Report on Inorganic Chemistry:—

Potassium Chlorate and Chlorine Vapours.

BY L. W. HAWKINS, F.C.S.

A few months ago a sample of potassium chlorate, in powder, was sent to me for examination. The complaint was that when bottled for a short time or warmed on a water-bath, chlorine vapours were given off, so that salines made with it after drying were objectionable. A stoppered bottle containing some of the chlorate was also enclosed. On loosening the stopper it was expelled with some force and a strong odour of chlorine was given off. The sample in paper was free from smell, but on bottling a portion and placing it in hot water chlorine was evolved in a few minutes.

The presence of a trace of hypochlorite was first suspected and tested for by means of potassium iodide and starch paste, acidified with a little acetic acid. No immediate colour was produced, indicating absence of hypochlorite, but after standing a short time a slight blue colour made its appearance, which gradually became much deeper. Pure potassium chlorate was then treated in the same way with exactly the same result. Fresh experiments were now made, tartaric, citric and carbonic acids being separately substituted for acetic acid, and in each case both with pure chlorate and the sample; the formation of iodide of starch resulted after a time. These results proved firstly that hypochlorite was not the impurity present in the sample, and secondly, that the organic acids if given a little time will of themselves chemically act on potassium chlorate, giving rise to chlorine vapours, and that some act more powerfully than others in the following order, tartaric, citric, acetic and carbonic. Trials were then made without the addition of any acid, solutions of pure chlorate and the sample being each treated with potassium iodide and starch paste only. While the pure chlorate remained indefinitely unacted upon, the sample behaved just as in the previous cases. This made the presence of an organic acid very probable, and the salt was accordingly tested for the same.

The action of the solution on litmus paper was very faintly acid, and when a fair quantity was heated on platinum foil a few very small specks of charred matter were observed. The organic acid thus indicated was then identified as tartaric, confirmatory tests being distinctly obtained with the concentrated solution made by crystallizing out the potassium chlorate two or three times. The trace of tartaric acid was then estimated with decinormal soda and phenolphthalein. A few estimations were first taken without mixing the sample, taking the quantities from the more powdery portion, and not touching the aggregated lumps. The results varied from ·3 to ·5 per cent., but when the sample was thoroughly mixed the percentage was only ·034. The moisture present was found to be ·14 per cent., and the chloride ·04 per cent.

To make certain whether such a small quantity of tartaric acid would do such mischief, mixtures were made in imitation of the sample composed of pure powdered potassium chlorate, and 1, ·4 and ·05 per cent. respectively of tartaric acid. When bottled and surrounded with hot water, even the least acid of these liberated chlorine vapours in less than five minutes. When merely bottled without heat the same effect was produced after standing some time, the time taken varying according to the strength of acid, the first taking a few hours and the last some days. In much larger proportions the action is almost immediate. Mixtures made with citric acid instead of tartaric acted just the same.

The amount of moisture in the pure chlorate used for these experiments was less than ·2 per cent., which is as near to dryness as could conveniently be effected. Another mixture was made containing 1 per cent. of tartaric acid, when the ingredients were first carefully dried, mixed warm, and enclosed in a perfectly dry bottle. In this case no chlorine vapours were obtained.

The chemical action probably consists of the production of chloric acid by double decomposition, which on account of its great instability soon splits up into perchloric acid and chlorine tetroxide, which latter again is very readily decomposed into its elements, $3\,HClO_3 = HClO_4 + H_2O + Cl_2O_4$.

The above facts being ascertained some light appeared to me to be thrown on the old mystery of the explosion of Lamplough's pyretic saline in bottles. Lamplough's is the only well known saline which gives the trouble, and is the only one which contains potassium chlorate. On making inquiries of a few retail chemists who make their own salines I found that in two cases where chlorate was used the same trouble existed. If any salines be damp there is some liability to explosion by the carbon dioxide evolved, but Messrs. Lamplough have suffered so much for some years by their bottles bursting, that it is only fair to suppose that they are as careful about drying their ingredients as other makers. I have estimated the moisture in a sample of their saline and found it to be ·63 per cent. This I believe to be quite sufficient for the chlorine reaction.

The conditions in Lamplough's saline for the evolution of chlorine vapours, are of course not so favourable as in a mixture of chlorate and tartaric acid only. Sodium bicarbonate is also present, and the amount of chlorate is comparatively small, so that the action would be impeded to some extent. Moreover the bicarbonate of sodium is in excess, for if some of their saline be dissolved in water and boiled the resulting liquid is alkaline. Although I have not yet succeeded in liberating chlorine vapours from Lamplough's saline itself, I cannot help thinking that the continual heat of summer or of a hot room would in time liberate the explosive vapour which when exploding bursts the bottle. It may be advanced that no smell of chlorine is noticed when a burst bottle is discovered. This may be so, for on taking a chlorate reeking with chlorine by means of a trace of tartaric acid, and emptying it from the bottle on to paper exposed to the air the odour was almost immediately dissipated.

By a coincidence I notice that since my results were obtained the subject of Lamplough's saline bursting in bottles has been revived in the correspondence columns of the *British and Colonial Druggist*, the majority of correspondents, including Messrs. Lamplough themselves, still holding to the carbon dioxide theory. One gentleman, however, having recognized that Lamplough's is the only saline giving trouble, and also the only one containing chlorate, suggests the possibility of peroxide of chlorine being formed, without, however, offering any theory to explain its production.

At the conclusion of the Report, bottles containing chlorate of potassium with small admixtures of tartaric acid were passed round, and with as little as 0·05 per cent. the odour of chlorine was very strong.

A discussion followed, in which the Chairman, Messrs. Browne, Burridge, Ough and the Secretary joined.

After a little miscellaneous business the meeting adjourned.

CHEMICAL SOCIETY.

A meeting of the Chemical Society was held on Thursday, March 7, Mr. W. Crookes, F.R.S., President, in the chair.

A number of certificates were read for the first time, and the following papers were read :—

The Decomposition of Carbon Disulphide by Shock; a Lecture Experiment. By T. E. THORPE, F.R.S.—The author in studying the action of the fluid alloy of potassium and sodium on carbon disulphide, obtained a yellowish-brown solid substance which exploded with great violence when subjected to pressure or friction. If the explosion occurred in contact with carbon disulphide that substance was resolved into its elements. As carbon disulphide is an endothermic compound the author was induced to try whether its vapour could not be resolved into its elements by the explosion of various detonating agents, *e.g.*, mercuric fulminate, in the manner indicated by Berthelot. It is found that such a decomposition is readily effected by exploding a charge of 0·05 gram fulminate within a stout glass tube containing a few c.c. of carbon disulphide vapour. The carbon disulphide is at once resolved into carbon and sulphur, which line the inside of the tube. The experiment may be easily made with perfect safety, and forms a good illustration, for class purposes, of the resolution of an endothermic substance into its elements by sudden shock.

The President pointed out that the spectrum of mercury was rich in ultra-violet rays, and suggested that perhaps the decomposition was induced by these rays.

Professor Thorpe, in reply, said that this explanation had not occurred to him; he believed, however, that the effect was purely mechanical, inasmuch as Berthelot had, in fact, exploded nitrous oxide by sudden compression. In reply to Mr. Groves, he said that he had only experimented with the gaseous disulphide; he believed that no explosive compound was formed by treating the disulphide with sodium.

The Determination of the Constitution of the Heteronucleal αβ- and ββ-di-derivatives of Naphthalene. By HENRY E. ARMSTRONG and W. P. WYNNE.

The Action of Chloroform and Alcoholic Potash on Phenyl-Hydrazine. By S. RUHEMANN, Ph.D., M.A.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The annual dinner of the Liverpool Chemists' Association took place on Thursday evening, March 14, at the Royal Restaurant. Mr. A. H. Samuel, F.C.S., the President, occupied the chair. The company was large and representative, and among the visitors were Doctors Bailey and W. Glover Moore, and Messrs. W. E. Evans, Gwilym Evans, T. Tyrer, A. H. Mason, and E. Harland.

After an excellent dinner, the usual loyal toasts were heartily proposed and drank.

The President then proposed the toast of the "Liverpool Chemists' Association." In doing so, he said that since last year the Association had had a very considerable accession to its ranks by the union with it of the Registered Chemists' Trade Association of Liverpool. It therefore now represented the commercial as well as the scientific objects of the calling. From a scientific point of view this Association was one of the leading learned societies in the city. All were proud of the position it had earned for itself by transactions showing a mass of original work and research extending over the past forty years. These records would rank successfully with those of any other similar institution in the United Kingdom. If in these days chemists were to successfully assert their rights and privileges they must combine together for this object. In that respect this Association had been of unquestionable value to its members in the past, and was likely to be of even greater value in the future. He had often heard it asked, what was the use of the severe training and high class education in botany, chemistry, and natural philosophy, which was now required to qualify them to become chemists, when they daily witnessed their business being gradually undermined by competitors in other trades? Their answer should be that knowledge is power, and that it was the very training and education they were apt to underrate which would enable the chemist of the future to successfully hold his own. Let the chemist utilize his skill and knowledge by becoming the manufacturer himself of most of the articles required by his clients. He would thereby not only assert his independence, but would retain the whole profit in those articles as his reward. They heard a great deal of what machinery had done to supplant hand labour, but he had yet to learn that any powers of invention had succeeded in dispensing prescriptions by machinery. That being so, the chemist had a right to demand his price, and the public, recognizing that the safety of their lives was in the hands of the chemists, would be willing to pay for skill and education. Altogether, if these lines were followed, he had great hope of success in the future, and in no way could it be better furthered than by taking an active interest in institutions like the Liverpool Chemists' Association.

Mr. J. S. Ward, F.C.S., in responding said that the fact of the Association having existed for forty years showed that it had been directed by wise councils. In this Association the chemists of Liverpool had an organization pre-eminently adapted for the discussion of commercial questions, and if they gave it the support it deserved, they would be known throughout the country as a body which was doing great good for the trade at large.

Mr. T. F. Abraham, in submitting the toast of the "Pharmaceutical Society of Great Britain," said that if the Society did not represent the pharmaceutical body it was the fault of the body themselves. So long as they sent to the Society men with honest motives, their interests would not suffer.

In responding, Dr. Symes said he thanked Mr. Abraham for the manner in which he had proposed this toast, and the company for the manner in which had been received. He had as a member of the Council acted according to the best of his judgment, in a free and independent manner, and this as they were aware brought him rather at cross purposes with some of his colleagues, but that in no way interfered with personal friendship. He hoped that there would be a bending of the Council to the every day wants of chemists and druggists. His great wish was that the Society should grow in number and influence, and that instead of consisting of some 3000 members with 10,000 outside, it should embrace the whole commonwealth of pharmacy. If the Council often appeared to act as if it alone were the Society, this fact was in a great measure due to apathy amongst its members. He would like to see the members take more interest in pharmaceutical politics, and to exercise more markedly their individuality. That the trade was at present in

a bad condition as a whole no one could deny, and a majority on the Council hoped to set things right by educational enactments. He believed in education, and the power of knowledge, but he felt assured that something more than this must be attempted, that there must be a united effort to accomplish something beyond this factor, before the good results were brought about which he hoped and believed could yet be accomplished.

The toast of the "Medical Profession" was proposed by Mr. J. Hockin and responded to by Dr. Bailey. The toast of the "Wholesale Trade" was proposed by Mr. J. Woodcock and responded to by Messrs. W. E. Evans, A. H. Mason and T. Tyrer. The other toasts were "The President," proposed by Mr. M. Conroy, F.C.S., "The Vice-President and Officers," proposed by Mr. E. Davies, F.C.S., F.I.C., and responded to by Mr. R. Parkinson, "Our Musical Friends," proposed by Mr. J. R. Day, and responded to by Mr. Frank Lott, who acted ably as accompanist.

A capital musical programme was given by Messrs. H. J. Nicholls, W. Lewis, F. W. Loxton, J. Bain, W. Brinson, and J. Basterfield, and two readings were admirably rendered by Mr. H. Jackson.

LIVERPOOL PHARMACEUTICAL STUDENTS' SOCIETY.

The first ordinary meeting of this Society was held in the drawing room of the Young Men's Christian Association, on Tuesday evening, March 12. The President, Mr. H. B. Thornton, F.C.S., who was in the chair, gave a short address, showing the advantages to be gained by joining the Society.

A social meeting followed, in which the following gentlemen took part:—Messrs. W. Brinson, G. Brinson, Fleetcroft, Jackson, Loxton, Manley, McMillan, Wield and Professor Clegg. Mr. Barberry presided at the pianoforte.

The next meeting will be held on Tuesday, March 26, when papers will be read by the President, Mr. Fleetcroft, Mr. Riddle and Mr. Tozer.

MANCHESTER PHARMACEUTICAL ASSOCIATION.

A meeting of the above Association was held in the rooms of the Chemical Club, Victoria Hotel, on March 13, Mr. G. S. Woolley in the chair.

The minutes of the previous meeting having been read and confirmed, Mr. W. Spencer Turner read a paper entitled "Rambling Notes on the English Medicinal Plants."

A discussion followed, in which the Chairman, Messrs. Wilkinson, Kemp, Smith, Hart and Wilson took part.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

A Musical and Social Meeting was held at the Colonnade Hotel, Birmingham, on Tuesday evening, March 19, when members and associates rendered songs and recitations. Owing to the unfavourable weather the meeting was not so good as usual.

Mr. Thompson invited members to make inquiries about a convenient cricket field for the use of the Association during the coming season.

At a meeting of the Council, held at the Mason College on Wednesday afternoon, March 20, the proposed new railway rates were discussed and a committee appointed, consisting of Mr. G. E. Perry (President), Messrs. Alcock, Arblaster, Barlow, Howes, Southall, Thompson, and Wyley, to take such action as they may think desirable.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

A "Students' Night," which was well attended, was held on Wednesday, March 13. In the unavoidable absence of the President, Mr. G. T. W. Newsholme took the chair.

The minutes of the last general meeting having been read and confirmed, Messrs. Eardley and MacLeod were elected members of the Society, after which the following papers were read on "Filtration," by Mr. C. D. Moffat; "Hints to Students," by Mr. Lewis Mac Leod, and "The Minor Examination," by Mr. W. A. Shaw. The publication of these papers is unavoidably deferred from want of space.

A discussion followed the reading of the papers, in which Messrs. Grierson, Humphrey, Morrison and Smith took part.

Votes of thanks to the Chairman and essayists brought the meeting to a close.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The eighth meeting of the eleventh session was held in the Pharmaceutical Society's House, 36, York Place, on the evening of Wednesday, March 6, at 9.15, Mr. George Coull, President, in the chair.

The minutes of last meeting having been read and adopted, the following communications were read:—

Casein as an Emulsifying Agent.

BY PETER BOA.

The author said that a paper read to the Paris Pharmaceutical Society about two years ago by M. Leger had suggested this communication. An abstract of M. Leger's paper had been published in the *Pharmaceutical Journal.*

It was not his (Mr. Boa's) object to present a series of formulæ showing the use of casein for emulsification. The intention was rather to indicate the way in which casein might be obtained, and leave anyone desiring to use it to construct his own formulæ.

His initial efforts to obtain casein by following directions in text-books were unsuccessful. These took no notice of temperature. In the cold the casein did not precipitate in a workable form when an acid, acetic for example, was added to milk. When the milk was heated to 115° or 120° F. before the acid was added the casein was readily obtained.

M. Leger recommended milk to be shaken with ammonia and allowed to stand till the saponified fat had risen to the surface; the serum was then drawn off, and from it the casein was precipitated by acetic acid. When the serum was warmed previous to addition of the acid the process worked well. The ammoniated milk, however, required nearly two days to separate into two layers.

A quicker process, and one giving a purer product, was to precipitate the casein from skim milk, which was always obtainable, and wash it free from butter-fat with alcohol, ether, and finally water. On a large scale, M. Leger's process would be cheaper.

The casein obtained in this way had an acid reaction and rough alkali, sodic carbonate, for example, had to be added to render it slightly alkaline before it became again soluble in water and suitable for use. It existed in milk as a soluble albuminate of an alkali. When acid was added to milk it took up the alkali and liberated insoluble casein. The subsequent addition of an alkali merely restored it to its normal condition.

In using the casein for emulsifying, the author found a temperature above 100° F. better than a lower one. In fact the temperature suited to precipitation seemed best suited to resolution.

Pharmaceutically he did not consider milk a first rate

type of emulsion. It quickly and invariably separated, the fat rising to the top in the shape of cream. Casein produced with oils or oleo-resins an emulsion which when newly shaken, looked well, but in a short time it separated. As regarded the quantity to use, he thought an approximation might be obtained by taking milk equal in bulk to the quantity of emulsion to be made. If a 6-oz. emulsion were wanted 6 ounces of skim milk would probably give the requisite amount of casein.

Note on the Deposit in Easton's Syrup.

BY J. H. MILLER.

The following short note may be interesting as confirming Mr. Peter MacEwan's opinion given a short time ago before the Assistants' Association in London. The specimen now shown contains no trace of quinine not giving any indication with Nessler's or Thresh's reagent. Dissolved in strong hydrochloric acid and tested it gives the usual reactions for ferric phosphate. The deposit was collected in comparatively warm weather, its appearance being simply that of a heavy insoluble powder, different altogether from the crystalline mass which the syrup is sometimes seen to exhibit in cold weather, and which is readily soluble in water.

It will be seen that this does not agree with the results reported at last meeting by Mr. Wilson, and the inference is that Mr. MacEwan and the other observers have been examining different deposits, or that where quinine has been found in the deposit it is due to insufficient washing. My experience is that the deposit is prevented by the addition of a little hydrochloric acid as recommended by Mr. Wilson.

Note on a Sample of Arseniate of Iron.

BY J. H. MILLER.

I have here an unusual commercial sample of arseniate of iron which came into my hands a few days ago and at once attracted attention from its red colour. As arseniate of iron is a pale green amorphous powder this assuredly could not be the salt of the B.P. A few rough tests gave the following results. It was soluble only after boiling with strong acid, whereas the official salt is readily soluble in cold hydrochloric acid. An analysis indicated the presence of iron and arsenicum, the iron being in the ferric state, without a trace of the ferrous. It was at first suspected to be ferric arseniate, but a more minute examination proved that this was not so. Heated in a dry test tube it gave a white arsenical sublimate, leaving a dark red residue, not unlike ferric oxide. This gave rise to the idea that it might be a mixture of arsenious acid and ferric oxide, but nothing could be dissolved out with boiling water.

In addition to the red colour of the sample, which condemns it at once, it is very gritty, and particles of a light colour can be detected by the naked eye. Examined under the microscope it has the appearance of a dark brick-red powder, mixed with colourless or pale yellow broken crystals. Possibly the arsenium is present as sulphide. The sublimate first obtained white and then partly yellow, showed a great resemblance to that from a little orpiment treated in the same way, and as in the case of the latter, sulphurous fumes were given off. The solution in nitric acid gave a precipitate with chloride of barium, indicating sulphur oxidized to sulphate. In whatever form the metals may be present it is clear that it is a mere mechanical mixture. The colour is considerably lighter than ferric oxide, more like the oxyhydrate, and this is confirmed by much moisture being given off on heating, and the esidue having the appearance of ferric oxide. A oison mixed with its antidote, however, is surely too ood a joke. A quantitative analysis might throw some light on its probable composition, but for this I have not had time.

Lanolin as an Excipient for Permanganate of Potash Pills.

BY J. H. MILLER.

As I have not seen the following suggestion published I thought this would be a good opportunity for making it known. It does not seem to have occurred to many that such an unoxidizable substance as lanolin would be well suited for massing these troublesome pills. Various excipients have been suggested from time to time, such as bee's wax and resin ointment, but these are faulty because they reduce the permanganate. More recently fullers' earth and kaolin paste have been recommended, and are better, but they form a mass difficult to manipulate.

As the pills I have massed with lanolin have only been made a comparatively short time it remains to be seen whether the new method is equal to the kaolin and soft paraffin in preventing decomposition, but they are still, as you will see, in very good condition. As an excipient it is simplicity itself, and exceedingly easy to work, ordinary anhydrous lanolin, in the proportion of 1 to 10 of permanganate, turning out a beautiful, perfect pill, only half the size of those made by the old method, and without any trouble.

The reading of the papers was followed by a discussion in which Messrs. Boa, Coull, Hill, McEwan and Miller took part, and, on the motion of the Chairman, votes of thanks were awarded to the contributors.

Parliamentary and Law Proceedings.

Poisoning by Chlorodyne.

On Friday, March 15, an inquest was held at the Royal Arms, Albermarle Street, South Shields, before Mr. J. Graham, coroner, concerning the death of Henry John Thornton, aged 25.

Mrs. Fowke said the deceased was her son. On Wednesday forenoon she went to his bedroom and found him in bed in an insensible condition. On the side of the bath in the room she saw a bottle that had contained chlorodyne. There was also a glass beside it, and this had contained chlorodyne. She at once sent for a doctor, and Dr. Gowans and his assistant, Dr. Turnbull, came. She had never seen him take chlorodyne on any previous occasion, and had never known him complain of sleeplessness. He was out of the house on the day before.

Dr. Turnbull deposed that the young man came to the surgery on the 22nd February. He examined him. He seemed in very low spirits and complained of having nothing to do with his time. He prescribed a tonic mixture. He saw no more of him till the 5th of March, when he again called at the surgery and complained of the same symptoms. As he seemed somewhat stronger he ordered him a still stronger tonic. He did not see any more of him till the morning of Wednesday, the 13th, when a message came that he had been found by his mother, as already stated. Dr. Gowans and he went immediately to the house. They found him in a bed which had been put in a bathroom. He was perfectly unconscious. There was a bottle on the bath. It had contained chlorodyne, but was empty. There was also a glass which had contained the same poison. He also smelt strongly of chlorodyne. He was pale, cold, and breathing very slowly. They used the stomach pump and stimulants, but he never made the slightest reaction. He died at 4·30 in the afternoon. Dr. Turnbull also drew the attention of the jury to the fact that the bottle did

not contain a label bearing upon it the word "Poison," though there was a Government stamp upon the bottle. Chlorodyne contained several very powerful poisons, amongst them morphia and prussic acid, both of which were deadly poisons. A proper dose of chlorodyne was thirty drops, but the bottle would contain 1 oz. or 480 drops.

The Coroner said the law as to the sale of poisons wanted thoroughly revising, a proof of which they had in the fact that a person could purchase chlorodyne without even a question being asked. Dr. Turnbull had very properly drawn attention to this matter.

The jury found deceased had died from the effects of a narcotic poison taken while in a state of temporary insanity.—*Shields Daily Gazette.*

Review.

ARTIFICIAL PLANTS or "FLORA ARTEFACTA," arranged by CHRISTINE JAUCH, under the scientific supervision of R. STEIN, Inspector of the Royal Gardens, Breslau. Agents for the United Kingdom, Southall Brothers and Barclay, Birmingham.

The 'Flora Artefacta' consist of artificial flowers, of life size as regards flowers and leaves, etc., and are exact imitations as to the colour, shape and margin of the leaves and the structure of the flower. The series at present issued consists of a set of sixty plants of medicinal or economic interest, in six series of ten each, fifty out of the sixty being medicinal plants. Besides these there is also a special set for illustrating the plants used in ophthalmic surgery and medicine, as mydriatics or myotics, etc.

These models are intended to be used by lecturers on botany or materia medica, etc., to demonstrate the character of such plants as cannot easily be obtained in the living state, and it is claimed that they possess the advantage over dried specimens that the botanical characters of the flower are more easily seen, and over the large models hitherto used that the student can obtain from them a much better idea of the size and general appearance of the plants imitated.

So far as can be judged from the specimens before us there is no doubt that they are most carefully prepared and skilfully put together, and give a far better idea, when examined at the distance of two or three feet, of the size, habit and general appearance of the plants in a state of nature than can be obtained from herbarium specimens, and in so far they will no doubt be found very useful as adjuncts to diagrams.

They cannot, however, supersede the latter, inasmuch, for instance, as it is impossible to get any idea of the structure of the ovary from a flower which cannot be pulled to pieces, nor can the character of the anther, whether innate, etc., or dehiscing by pores or valves, be easily shown. Some of the series will be particularly useful for purposes of illustration, such as the almond and *Œnothera biennis*, in which the petals either fall rapidly, or the flower closes at an inconvenient hour; others, such as the vanilla and senna, which cannot be obtained in flower, as a rule, even at Botanical Gardens, are likely to prove equally acceptable, and to these two classes of plants no doubt many others, such as Sanguinaria, poppy, *Cistus*, etc., might be added with advantage. Two other series are promised, which will include *Hydrastis* and *Podophyllum*, *Turnera aphrodisaica* and *Aloe vulgaris*. The latter named plant belongs to a class which cannot be well represented by herbarium specimens, and of which even in a diagram it is difficult to give an idea of the fleshy character of the leaves. Considering the knowledge and skill exercised in constructing these models, the price is very reasonable, viz., 2*s*. 9*d*. each, or 25*s*. per series of 10. The ophthalmological set in which resin, bulbs, bark or seed is added to the plant as required, are more expensive (5*s*. to 7*s*. 6*d*. per specimen).

Notes explaining the natural order properties and uses of the plant are appended to each specimen.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE PHARMACEUTICAL SOCIETY AND THE TRADE.

Sir,—The perusal of the transactions at the last meeting of the Council gives rise to various reflections; as a humble member of the Society I suppose I ought to be proud that we are such noble patrons to science in furnishing and endowing the Research Laboratory so amply, and that we possess such magnificent buildings at Bloomsbury Square.

All this large expenditure may, I suppose, be regarded as in the direction of some of the purposes for which we were incorporated.

Referring to the Royal Charter of Incorporation, one of the objects for which the Society was founded is stated to be "for the protection of those who carry on the business of chemists and druggists."

The question has lately arisen, or rather has become much more inflamed, with respect to the arbitrary manner in which the Stamp Act is enforced and the encroachments by the Board of Inland Revenue upon what has been allowed ever since I have been connected with the business, and the question occurs, how is it that the occupation of a pharmacist, or chemist and druggist, is trammelled by such injurious and irksome restrictions, which no other trade would tolerate? This remnant of feudal times, when commercial restrictions were universal, is an anachronism in this nineteenth century.

At a recent meeting of the trade at Newcastle, upon this important question, the suggestion to ask the Pharceutical Society to take it up was regarded as perfectly useless. I ask why such a conclusion? Surely the matter only requires bringing to the notice of the Council, requesting them to use the powers conferred upon it by Charter, and delegated to it by the members of the Society, to endeavour to remedy the existing injurious state of things.

The fact is, this antiquated Act is of such an arbitrary, despotic and far-reaching character, that if it was rigorously enforced, there is not a chemist in the kingdom free from liability.

Of course, an agitation of this kind means expenditure, and possibly fighting, but this is one of the conditions for which the Council was elected. A tithe of the amount devoted to research would, if applied for this purpose, result in a substantial benefit to the whole of the trade, and the *kudos* resulting to the Council would immeasurably surpass anything to be derived from research, however elaborate, or buildings, however magnificent.

Harrogate. R. HAYTON DAVIS.

Sir,—When in London last week it was my privilege to be able to be present at a meeting of representative chemists from the various districts in and near London, who met at Bloomsbury Square at the invitation, I believe, of our genial and popular President, to have a friendly chat on matters bearing on the trade in general. When I entered that meeting I had feelings in common with those of the great majority of country or provincial chemists respecting the relation of the Council with the majority of the subscribers to the Society.

Our great poet writes that "A fellow feeling makes man wondrous kind," and perhaps it was the discussion of the grievances of the London chemists which led me to believe that the "lot" of the majority of them, like that of many in the country, was not wholly "a happy one," from a trade aspect.

Surrounded as they are by cutting stores, cheap dispensaries, and oilmen and drysalters retailing almost every-

thing except the scheduled poisons, the wonder is that they manage to make a decent living through all.

Among the many subjects touched upon was, how could we best gain more support for the Society from those chemists who are not at present connected with it? Well, sir, I think the meeting referred to is a move in the right direction, for what is wanted is that the President and Council should bring themselves more in touch with representatives of the trade from all parts of the country, by holding periodical meetings similar to the one held last Wednesday.

Giving opportunities for free discussion of matters of interest and making them known more directly to the Council would, I believe, be productive of much good. This could be done by holding quarterly or half-yearly meetings of all Local Secretaries with the President and Council in London, and let each Local Secretary act, not as the representative of subscribers only, but of all the legitimate chemists in his district. The opinion of a great many chemists is that the Executive steers its course in the interest of the few select pharmacies in the city and West-end, and that it cares little or nothing about the vexing questions which affect the larger portion of the trade. This may have been the case in years gone by, but I am now inclined to believe that the scientific pharmacist is willing to join hands with the commercial pharmacist for the common weal. Those outsiders who grumble at the Society, meaning of course thereby the Council, have the remedy in their own hands, for if they were to join the Society, they could, by their votes, send whom they choose to conduct its affairs. But I maintain that it is not common fairness for the nine or ten thousand non-subscribers to expect the two thousand or so subscribers to work for their benefit.

In unity is strength, and if we are to legislate for an improved condition of things, our chance of success would be much greater were the chemists of the country united in one strong society, instead of being disunited, as at present. Let all unite, and then we might become a power for good among ourselves.

EDMUND JONES.

RAILWAY RATES.

Sir,—I have been hoping to see some movement in the retail trade on the question of the proposed railway rates, and can only believe the apathy arises from the fact that chemists as a body are either entirely ignorant of the proposals or do not realize that if these rates become law our expenses for carriage will be increased all round at least 100 per cent. If then the trade wish to prevent this serious addition to their expenses, they must be up and doing, and that without delay. The wholesale trade are moving in the matter energetically, and I may say that Messrs. Francis and Umney, or the Chairman of the Chemical Section of the London Chamber of Commerce, upon which they are both acting, would be very happy to receive information or facts bearing upon the subject.

To strengthen their hands I would suggest that meetings be held in every town and protests entered against the proposed rates, and that pressure be brought to bear upon Chambers of Commerce, Members of Parliament, and others, and in this way we may hope to put some check upon the railway companies.

Leamington. W. H. PULLIN.

ESTIMATION OF NITRITES.

Sir,—May I briefly explain my question relative to Table No. III. in Messrs. Dunstan and Dymond's admirable paper on the above?

No difficulty arises as to the possibility of taking a definite and ascertainable very small amount of a compound for determination. I had in my mind the unstable nature of ethyl nitrite, and was desirous of learning how it was possible to be absolutely certain that ·088 gram or any other weight should be ethyl nitrite and not ethyl nitrite with some oxidation product. In working with such very minute quantities, any product of this character, if taken as nitrite, would seriously impair the accuracy of the result. The objection is of course valid against any method of estimating nitrites.

Though the pharmacist in an outlying district is not likely to use this process (or any other) for testing his single quart of spt. æth. nitrosi, the manufacturer, the large distributor and the analyst will be glad to avail himself of a test so short and sharp.

Deptford. JOHN MOSS.

NOTE ON EASTON'S SYRUP.

Sir,—On reading the article on the above subject in your issue of the 16th inst., by Mr. J. G. Wilson, the variability, as pointed out by him, to exist in commercial samples of the syrup struck me as being a great inducement for all pharmacists who wish to rely upon the article they dispense to manufacture their own, and as the B.P.C. formula only gives 6 grains of quininæ phosph. and 7·7 grains of iron, whereas the original contains 8 grains in 1 ounce, I thought the following formula, which I have used now for some time, might be useful to some of your readers; it gives a ready, and at the same time a very elegant, product, which keeps well, and contains 1 grain quininæ phosph., 1 grain ferri phosph., and $\frac{1}{32}$ grain of strychnine in 1 fluid drachm. The formula I employ is the following:—

Take of—

Iron wire free from rust . . .	149 grains.
Acid. phosph. sp. gr. 1·5 . .	℥iv., ʒiv., ♏ 16.
Water	℥iiss.

Place in a flask, plug the neck loosely with cotton-wool, and allow to stand until the wire has disappeared; filter, and pour water over the filter until the product measures ℥viij.

Then by the following:—

$$3Fe+2H_3PO_4=Fe_32PO_4+3H_2.$$
$$168 + 198 = 360.$$

Therefore 149 of iron will require 176 minims of H_3PO_4 to produce 320 grains of Fe_32PO_4, corresponding to 40 grains in each ounce of the liquid and leaving 2000 minims of free H_3PO_4 in the mixture, corresponding to 250 minims in each ounce of fluid. If, now, 4 ounces of liquid be taken and 160 grains of quininæ phosph. be added and stirred until it dissolves, and 5 grains of strychnine dissolved in ℥ss. of water with 10 minims of dilute H_3PO_4 and mixed with the above, and this made up to fluid ℥xx. by means of cold syrupus B.P., we have a syrup containing the full amount of ingredients, viz., quininæ phosph., 8 grms. to ℥j.; ferri phosph., 8 grains to ℥j.; strychnine ·25 grain to ℥j.; and phosphoric acid 50 minims. I have found this syrup keep extremely well when not exposed to light, and have not observed any deposit when kept for one month.

If a syrup containing less acid be desired, and it is certainly preferred by some, ℥iij. of the acid may be used; this keeps very well, but not so well as the one with the larger quantity of acid.

Worthing Infirmary. G. W. WEST.

POTASSIUM PERMANGANATE PILLS.

Sir,—Last week I had to make some permanganate of potassium pills, 2 grains in each. As I had not any kaolin ointment by me, I thought I would try the effect of a mixture of kaolin and lanolin. As far as appearance goes the pills turned out all that could be desired. I kept a dozen to see if any change took place, and as far as I can see none has occurred. The pills were varnished with sandarac and alcohol varnish (Martindale). I have not seen any note about lanolin being used before for this purpose.

Perhaps some of your readers will be able to say whether any decomposition is likely to occur if kept any length of time. The total weight of the mass was 29 grains, the formula used being—

Potass. permanganate	grs. 24
Kaolin	grs. ij.
Lanolin	qs.

The pills I may say are comparatively hard and retain their shape perfectly.

Clapham, S.W. ERNEST W. GOUGH.

H. Rudd.—The synthesis of coniine was effected by Professor Ladenburg (see *Pharm. Journ.* [3], xvii., 347). Some particulars as to the synthetical formation of bases allied to cocaine will be found in the *Pharmaceutical Journal* for December 29 last, p. 505.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. West, Armstrong, Morrison.

"THE MONTH."

Exalgine.

The physiological and therapeutic action of ortho-methylacetanilid forms the subject of an interesting communication to the Academy of Sciences by Messrs. Dujardin-Beaumetz and Bardet (*Compt. Rend.*, cviii., 571). Three methyl derivatives of acetanilid are obtainable in which the methyl group occupies respectively the para, ortho and meta positions. The compound reported on is that in which the group occupies the ortho position, and it has been named for convenience "exalgine," in accordance with its anodyne properties, from ἐξ, out of, and ἄλγος, pain. Exalgine occurs in needles or in large white tablets, according as it is obtained by crystallization or from the mass after distillation; it is slightly soluble in cold water, more soluble in hot water, and very soluble in water containing a little alcohol. According to the reporters exalgine produces an analgesic effect in quantities of 0·25 to 0·40 gram taken at a single dose, or of 0·40 to 0·75 gram taken in two doses in the course of twenty-four hours. The analgesic effect is said to be very marked, and in all forms of neuralgia, including visceral neuralgia, was thought to be superior to that of antipyrin. Up to the present no gastrointestinal irritation, rash, or cyanose has been observed after its administration, as occurs sometimes after taking antipyrin or acetanilid, except that in one case there was a slight erythema. Its toxic dose was ascertained to be 0·46 gram per kilogram of body-weight of the animal, the phenomena being those of impulsion, trembling and paralysis of the respiratory organs. After non-toxic doses the sensibility to pain disappears, but the tactile sense remains. In addition, exalgine is said to possess antiseptic and antithermic properties, but the anodyne action appears to be the dominant one. As a result of the study of a number of more or less allied bodies, the reporters have come to the conclusion that antiseptic properties are especially characteristic of alcoholic hydrated derivatives (phenol, naphthol, etc.); antithermic properties are especially predominant in amidogen derivatives (acetanilid, kairin, thallin); and, lastly, that analgesic properties are at the maximum in amidogen compounds in which an atom of hydrogen has been substituted by a molecule of a fatty radicle, and especially of methyl (antipyrin or dimethyloxyquinizine, acetphenetidin and exalgine or orthomethylacetanilid).

New Compounds of the Cinchona Alkaloids.

It is known that ordinary phenol, or carbolic acid, combines with some salts of the lævogyre cinchona alkaloids, especially with the sulphates, a quinine phenolsulphate having been described by Jobst and Hesse and found some use in medicine. The formula attributed to this compound is $(C_{20}H_{24}N_2O_2)_2 \cdot SO_3 \cdot C_6H_6O + 2H_2O$, according to which it would be a neutral quinine sulphate in which the sulphuric acid instead of a molecule of constitution water contains a molecule of carbolic acid. A number of compounds of the same alkaloid with multivalent phenols, such as phloroglucin, resorcin and orcin, were also prepared by Hlasiwetz and Malin from quinine bisulphate, and this has led Dr. Hesse to experiment whether an analogous compound of the bisulphate with ordinary phenol could be obtained (*Pharm. Zeit.*, March 23, p. 191). The attempt was so far successful that a compound having the composition represented by the formula $C_{20}H_{24}N_2O \cdot SO_3 \cdot C_6H_6O + 3H_2O$ was obtained in delicate white needles, but when this was dissolved in hot water it underwent decomposition, and the neutral salt crystallized out on cooling. Upon trying the acid quinine resorcin-sulphate it underwent similar change and the behaviour was found to be characteristic of all the compounds of phenols with quinine, hydroquinine, cinchonidine or hydrocinchonidine bisulphate. This has led to the preparation of a series of new neutral compounds of phenols with cinchona alkaloids, among which are briefly described quinine orcin-sulphate and pyrocatechin-sulphate, cinchonidine resorcin-sulphate and hydroquinone-sulphate, and quinine resorcin-hydrochlorate, hydroquinine-hydrochlorate, pyrocatechin-hydrochlorate and pyrogallol-hydrochlorate. If any one of these compounds be mixed with excess of sulphuric acid it appears to be split up and the phenol can then be shaken out with ether. It is thought that the neutral quinine hydroquinone-sulphate and the quinine hydroquinone-hydrochlorate will prove to be of special value as febrifuges.

A New Mydriatic.

Some recent researches upon hydronaphthylamine, by Messrs. Bamberger and Müller (*Berichte*, xxi., 1112), would appear likely to result in another useful contribution from the chemical laboratory to the materia medica. The compound in question bears the systematic name tetrahydro-β-naphthylamine ($C_{10}H_7 \cdot H_4 \cdot NH_2$), and appears among other interesting physiological properties to be capable of causing the dilatation of the pupil of the eye in a remarkable manner. According to Professor Filehne, of Breslau, the instillation of a little 1 to 5 per cent. solution causes the dilatation of the pupil of the eye treated only; but dilatation takes place to a strong degree in both eyes as soon as a sufficient quantity—still very minute—has become absorbed in any way, as for instance, after subcutaneous injection. The pupils are dilated wider than by atropine, and a pupil already dilated by a maximum dose of atropine is still further dilated by this substance. The physiological action of tetrahydronaphthalamine is not identical with that exerted by the tropeines in the production of mydriasis, since, when applied locally, instead of paralysing the contracting muscles of the pupil, as they do, it stimulates the nerve-endings connected with the dilating mechanism.

Paraldehyd.

It is now about six years since paraldehyd was introduced by Dr. Cervello as a hypnotic possessing certain advantages over chloral hydrate, but the extent to which it has found acceptance has not yet proved equal to the claims that were made on its account. Renewed attention to it will, however, probably result from the publication of an important contribution to the clinical history of the compound by Dr. J. Gordon, of Aberdeen (*Brit. Med. Journ.*, Mar. 9, p. 515). On the basis of the result of careful experiments Dr. Gordon enumerates the following points, among others, as those upon which depend the advantages of paraldehyd as a hypnotic, to which group it distinctly belongs. It is not a cardiac depressant; it has no marked limit of toleration, since in cases of insomnia from overwork it has been given in the same doses with equally good hypnotic effects for months; it does

not exercise a hypnotic effect upon persons not suffering from sleeplessness, except in large doses, and no marked craving for the drug appears to be induced by its use; its action is speedy, generally within ten minutes after administration, the sleep induced being tranquil and quiet, with diminished respirations; it is not liable to disorder the digestion and in many cases it is gently laxative in its action. It was observed that the administration of paraldehyd caused an increase in the excretion of urea, but did not particularly affect the quantities of chlorides. In the majority of cases the excretion of the fluid constituents of the urine was diminished; in some cases, after a full dose the urine gave off the odour of paraldehyd, showing that some had apparently passed unchanged through the system.

Oil of Myrtle and Myrtol.

For some time past the essential oil of the leaves of *Myrtus communis* has been esteemed in France as a disinfectant and useful antiseptic, it has also been used in the Paris hospitals in certain affections of the respiratory organs and the bladder, and has been recommended as a local application in rheumatic affections. Recently under the name "myrtol" a substance described as the portion of the oil boiling between 160° and 170° C. has been introduced as preferable to the entire oil. This has induced Herr Jahns to investigate both the essential oil and the myrtol, with a view to ascertain to which constituent their medicinal properties are referable (*Archiv*, Feb. 28, p. 174). The sample of oil used, which was described as "Spanish," was pale yellow, had a specific gravity at 16° C. of 0·910, and was strongly dextrorotatory. The oil began to boil at 160° C., and about 80 per cent. distilled between that point and 240° C. Upon further fractionation there were obtained (1) a terpene ($C_{10}H_{16}$), boiling at 158°–160° C., corresponding to a right-handed pinene; (2) cineol ($C_{10}H_{18}O$), boiling at 176° C.; and (3) a very small quantity of a camphor, probably corresponding to the formula $C_{10}H_{16}O$. The essential oil of *Myrtus communis* leaves would therefore appear to have practically the same composition as the oil of *Myrtus Cheken* leaves (*Archiv*, 1888, p. 666), and nearly the same as the oil of *Eucalyptus Globulus*, but with less cineol than the latter. The "myrtol" proved to be a mixture of right-handed pinene and cineol, and would be better described as rectified oil of myrtle. Herr Jahns is of opinion that the reputed activity of myrtle oil and myrtol depends upon their strength in cineol, which substance has been shown to be identical with cajeputol and eucalyptol, and he suggests that instead of such a mixture pure eucalyptol should be prescribed, or if the presence of terpene is thought desirable a mixture of eucalyptol with rectified turpentine would be equally efficacious and much cheaper than the essential oil of myrtle leaves. But in most cases it would be desirable to avoid the irritating action of the terpene upon the respiratory organs.

Hydrangin.

Hydrangin, a crystalline glucoside separable from the root of *Hydrangea arborescens*, a drug that has some reputation in the United States as useful in calculous complaints, is the subject of a communication from Mr. Schroeter (*Amer. Journ. Pharm.*, March, p. 117). It was obtained by treating an alcoholic extract of the drug with 1 per cent. aqueous solution of sulphuric acid, removing colour from the resulting liquid with chloroform and then shaking it with ether, upon evaporation of which hydrangin was left, but required further purification. It melted at 228° C., and dissolved in concentrated sulphuric acid with a distinct violet red fluorescence, whilst an alkali produced an intense opal blue. In 80 per cent. acetic acid it dissolved with a slight fluorescence, which became more decided on dilution with five to ten volumes of water. Analysis gave results said to correspond with the formula ($C_{34}H_{25}O_{11}$).

The Sugar of Fungi.

The saccharine matter present in fungi has been the subject of several researches, from the results of which it appeared to consist principally of two sugars mannite ($C_6H_{14}O_6$) and trehalose or mycose ($C_{12}H_{22}O_{11}\cdot 2H_2O$). Some species were stated to contain both these sugars and others only one of them, but from ergot of rye Mitscherlich reported that at one time he obtained trehalose and at another only mannite. With a view of clearing up the doubt M. Bourquelot examined eight species of *Lactarius*, which on being dried and extracted with alcohol yielded exclusively mannite, ranging from 1·9 to 15 per cent. (*Compt. Rend.*, cviii., 568). But when the freshly collected fungi were treated at once with boiling water, the water evaporated and the residue exhausted with alcohol, a crystalline mass was obtained, of which 75 per cent. consisted of trehalose. A similar result was obtained with *Boletus aromaticus*. It would therefore appear that the trehalose gradually disappears during the drying, which M. Bourquelot looks upon as a phenomenon of maturation comparable to what occurs in fruit after collection.

China Morada.

Under the name "*quina morada*," in some districts of Bolivia and the north of the Argentine Republic, a bark is known which has a therapeutical reputation similar to that of true cinchona. The use of the name however does not appear to be limited to one bark, but a "quina morada" sent over to Europe towards the end of last year as a false cinchona bark and investigated by Messrs. Arati and Canzoneri has been ascertained to be the produce of a Rubiaceous tree, *Pogonopus febrifugus*, Benth. and Hook. These chemists report (*L'Orosi*, Feb., p. 37) that they have separated from this bark an alkaloid that they have named "moradeine," a fluorescent substance and a tannin. The bark was in pieces 2 to 6 centimetres long, 2 to 3 centimetres broad, and from 1 to 4 millimetres thick, rugose and yellowish-white to rose coloured externally, or becoming purplish where long exposed to the air, scaly and dirty white on the inside. It was odourless, had a herby and bitter taste, and yielded an aqueous decoction having a blue fluorescence and an alcoholic tincture with a bluish-yellow fluorescence. The fluorescent principle, which has been named "moradin," presented many points of resemblance to the scolopetin found by Eykman in *Scopolia japonica*, but differed in having the composition probably represented by the formula $C_{16}H_{14}O_6$. It crystallized readily from alcohol, melted at 201° to 202° C. without volatilizing, and had the properties of an acid, but the salts were difficult to prepare on account of their instability. The alkaloid, moradeine, has not yet been closely investigated.

The *Symphoricarpus vulgaris*, or "coral berry" tree, has been introduced to the medical profession

Symphoricarpus Vulgaris.

by Dr. Newton, of Oswego, as a new and valuable alterative and diuretic (*Med. Bull.*, March, p. 93). The plant belongs to the natural order Caprifoliaceæ and is said to be common in the southwestern United States over a large tract of country. It is described as a low undershrub with oval leaves, seldom exceeding an inch in length, and red fruit persistent during the winter. The twigs are the portion used in medicine, and they are said to yield their virtues readily to water or dilute alcohol.

Polypodium Friederichsthalianum.

The multiplicity of new remedies that have been introduced into Europe from South America in recent years would appear to have temporarily satiated the seekers after therapeutic novelties, judging from the account given by Dr. H. Polakowsky of a hitherto futile attempt to get a supposed valuable drug investigated (*Apot.-Zeit.*, March 9, p. 262). The drug in question is the *Polypodium Friederichsthalianum*, Kze., a fern described as growing in Costa Rica and probably other parts of Central America and Columbia on the branches and stems of various forest trees. It has a local reputation as an infallible antidote against snake bite, when administered to a bitten person in the form of a hot infusion. Dr. Thiel, Bishop of Costa Rica, felt sufficiently interested in the remedy some time ago to send a small quantity to Europe for experiment, and this was handed over to Professor Liebreich, whose report after an interval of two years was so far favourable that it stated that of four rabbits treated with an injection of an ether extract of the drug after having been bitten by an African adder two had recovered and two had died. Meanwhile, Bishop Thiel had received information that the plant possessed also antisyphilitic properties, a hint that seems to have quickened his appreciation of its possible value, for in a letter asking that experiments might be made in this direction he says, "Should its remedial power against syphilis be verified I should naturally reserve certain rights." Eventually, Bishop Thiel sent over a larger quantity for further experiment, and Dr. Polakowsky after trying unsuccessfully during several months to get the investigation taken up at one of the pharmacological institutes of the German universities has been obliged to content himself with publishing his narrative and presenting a sample of the drug to the German Pharmaceutical Association. The dried plant is described as having a very strong agreeable odour, which is also observable in the watery extract.

False Chiretta.

Falsely packed chirata has again appeared in the market this month, the adulteration consisting of *Ophelia angustifolia* and *O. alata*. As these both afford a paler and less bitter infusion than the true drug the occurrence of such specimens should be guarded against in retail pharmacy. The absence of a well-marked pith and a thicker ring of wood in the stem are evidence of *O. angustifolia* and a pale yellowish tint and very little bitterness of *O. alata*. It is now more than ten years since the occurrence of *O. alata* was noticed (*Pharm. Journ.*, [3], vii., p. 871), and two years since it was met with at Manchester (*Pharm. Journ.*, [3], xvii., p. 903) by Mr. Elborne. *O. angustifolia*, since it was detected by Professor Bentley in 1874 (*Pharm Journ.*, [3], v., p. 401), has frequently occurred in a commercial sample of the drug.

Andromedotoxin.

A number of Ericaceous plants have been examined by Professor Plugge to ascertain whether they contain the poisonous glucoside, andromedotoxin, observed first in *Andromeda japonica*. The result has been (*Nederl. Tidschr. v. Pharm.*, March, p. 84) that andromedotoxin has been found in *Andromeda japonica*, Thunb.; *A. polifolia*, L.; *A. Catesbaei*, Walt.; *A. calyculata*, L.; *Rhododendron ponticum*, L.; *R. chrysanthum*, L.; *R. maximum*, L.; *Azalea indica*, L.; and *Kalmia latifolia*, L. On the other hand it has not been detected in *Rhododendron hirsutum*, L.; *Ledum palustre*, L.; *Clethra arborea*; *C. alnifolia*; *Arctostaphylos officinalis*, Wimm.; *Chimaphila umbellata*, Nutt.; *Oxydendron arboreum* or *Gaultheria procumbens*, L.

Adulterated Asafœtida.

The practice of adulterating asafœtida with gypsum, chalk and various earthy matters is well known, but it is seldom probably that the falsification is carried to the extreme observed in a case reported on by Moerner (*Journ. Pharm. Chim.*, March 1, p. 241). The sample, which was sent by a Hamburg firm to a Swedish pharmacist under the designation "*asafœtida in lacrymis*," had the odour of asafœtida, and consisted of small angular pieces, none exceeding two centimetres, varying in colour, the pieces being easily separable into four varieties. About 70 per cent. consisted of dirty greyish-white resinous-looking fragments, which on fracture proved to be alabaster, coated with a thin layer of asafœtida resin. Another 20 per cent. of yellow or yellowish-brown resinous-looking pieces, also consisted of alabaster, but coated with a little thicker layer of resin. Another 5 per cent. consisted of alabaster simply. And lastly, there was about 5 per cent. of small violet-red or brown scales of true asafœtida. The coatings of resin having been removed by alcohol it was found that the entire drug consisted of 86 per cent. of mineral and 14 per cent. of asafœtida.

Test for Podophyllin.

According to Podwyssotzki the active constituent of podophyllin is podophyllotoxin, which is present in commercial samples of podophyllin to the extent of from 20 to 30 per cent. Herr Kremel gives the following method for its determination (*Pharm. Post*, Feb. 17, p. 105). About a gram of the resin is treated with chloroform in the cold as long as anything is dissolved; the greater part of the chloroform is then driven off by heat and the remainder of the chloroformic solution is poured into twenty times its volume of light petroleum spirit. The podophyllotoxin separates out and can be removed, dried and weighed.

Causticity of Carbolic Acid.

Some interesting details were given recently by M. Carles to the Bordeaux Medical Society explanatory of the varying effect produced by solutions of carbolic acid upon mucous membrane according to the solvent used (*Bull. Soc. Pharm. Bord.*, Feb., p. 41). If carbolic acid be added to pure neutral glycerine in any proportion up to an equal weight a mixture is obtained which is tolerated for a long time on the epidermis of the hand without inconvenience, while the smaller proportions are borne even by the mucous membrane of

the nose; but if the glycerine used be already aqueous, or if the mixture be diluted with water, it becomes irritant and caustic, and is no longer tolerated even by the skin. Considering that glycerine is an alcohol and that phenol is also nearly allied to the alcohols, M. Carles inferred that when the two are brought together in a pure state a kind of compound ether is formed that is easily decomposed by water, the constituents then regaining their characteristic properties. This was confirmed by the behaviour of a saturated solution of carbolic acid in ethylic alcohol, a drop of which left upon the hand for several minutes produced no unpleasant sensation or blanching of the skin; but immediately upon moistening the alcoholic spot with water there was produced a violent smarting, followed by a persistent reddening of the skin. M. Carles therefore suggests that in cases of burning with concentrated carbolic acid it would be better to remove the caustic with strong alcohol than with water.

Iodine Ointment.

Some experiments made with lard, lanolin and petrolatum, to determine which is best suited as a basis for iodine ointment, are reported by Mr. Cannon (*Amer. Journ. Pharm.*, March, p. 128). Samples of iodine ointment made with each of these three substances were submitted to varying conditions, being kept in the dark or exposed to diffused light or direct sunlight, after which they were dissolved in alcohol and the iodine determined with a volumetric solution of sodium hyposulphite. Lanolin was the basis from which invariably the largest amount of iodine was recovered.

Lard Testing.

An observation recorded by Mr. J. A. Wilson (*Chem. News*, Mar. 1, p. 99) suggests a fresh doubt as to the reliability of the test for the presence of cotton-seed oil in lard dependent on the reduction of silver nitrite. Two samples of old cotton-seed oil, which had been in the laboratory thirteen and seventeen months respectively, failed to cause reduction when the silver test was applied to them either separate or mixed with lard, although they responded distinctly to other tests for that oil. If this behaviour be confirmed by further experience it will be evident that although the reduction of silver nitrate may indicate the presence of cotton-seed oil, non-reduction will not prove its absence.

Artificial Diastase.

A communication to the Berlin Chemical Society by Herr Reychler (*Berichte*, xxii., 414) appears probably to afford a clue to the manner of the formation of the diastatic ferment. Herr Reychler says he has found that if freshly prepared wheat gluten be digested with very dilute acid at a temperature of 30° to 40° C., after some hours a considerable quantity of the albumenoid is dissolved to form an opalescent liquid, which is not coagulated upon boiling. This liquid gives with guaiacum tincture and hydrogen peroxide the intense blue colour which, according to Lintner, is characteristic of diastase; it is also capable of exercising a diastatic action in the saccharification of starch, which, however, it loses if boiled, or if alkali or too much acid be added. Other albumenoids, such as albumen or gelatin, when similarly treated, did not yield a similarly active ferment; but the soluble albumenoids from wheaten flour showed Lintner's diastase reaction, and saccharified starch to a certain extent, which was increased by the addition of a little acid. The inference drawn by Herr Reychler is that it is not improbable that in the germination process of barley and other seeds the development of solubility and fermentive power in a portion of the albumenoids is effected similarly as in the solution of gluten in a very dilute acid.

Bile and Digestion.

In a recent communication to the Royal Society upon the influence of bile on the digestion of starch Messrs. Martin and Williams state that if pig's bile be added to a mixture of starch with pancreatic extract in quantities up to 4 per cent. the digestion of the starch goes on more rapidly than without the bile. This property has been found to be dependent upon the presence of bile salt (hyoglycholate of sodium), the increased rapidity of digestion being well marked when 0·6 to 2 per cent. of bile salt was added to the digestive mixture. This influence extended not only to the change of starch into dextrin, but into sugar also, the quantity of dextrin and sugar formed in the presence of bile salt being one-fifth more than in their absence.

Flowers altered by Mites.

Some interesting experiments carried out at Innspruck by Professor Peyritsch show that double flowers may be produced by the agency of mites. He transferred some mites found on a wild double flower of *Valeriana tripteris* to other plants of the natural order Valerianaceæ, Cruciferæ, Scrophulariaceæ, Commelynaceæ, etc., with the result that various kinds of double flowers were obtained, as well as torsions and fasciations of the shoots. The doubling consisted in petalody of the stamens and pistils and prolification and duplication of the corolla. Even the leaves were affected by the mites, the margin showing comb-like teeth. In *Linaria cymbalaria* peloriate flowers and other changes were found. The results obtained would appear to depend upon how far the subject of the experiment is a good host plant for the mites, the plant in such case being quite crippled. In several cruciferous plants in which the flowers are normally ebracteate bracts were developed by introducing the mite found on the hazel to the plants. In the daisy the disc florets became green, the leaves more hairy, and the involucral bracts elongated. It was also observed that after infection lateral bud development was accelerated, whilst growth in length was slow ('*Trans. Imp. Acad. Vienna*,' xcvii., [1], p. 597).

Vascular System of Floral Organs.

At a recent meeting of the Linnean Society, Professor Henslow read a paper on the vascular systems of floral organs and their importance in the interpretation of the morphology of flowers. The author expressed the belief that by referring all organs back to their "axial traces," their real character can generally be discovered. The chorisis and union of vascular cords, as affecting the cohesion or multiplication of parts of the flower, was explained. The true nature of axile and free placentation was shown, the free central placenta of *Primula* being considered to consist of the coherent and ovule-bearing bases of five carpels, the upper part of their margins being united in a parietal manner. Carpophores and stylopodia, in like manner, were regarded as simply the coherent and hypertrophied margins of

carpels. The paper dealt with a considerable number of genera and natural orders, and will doubtless, when published by the Linnean Society, be perused with interest by all students of morphological and structural botany.

GOLD CHLORIDE AND SILVER NITRATE AS TESTS FOR FIXED OILS.*

BY FRANK X. MŒRK, PH. G.

In the *Pharm. Ztschr. f. Rusl.*, 1888, 721 (*Pharm. Journ.*, Jan. 26, 1889, p. 586), E. Hirschsohn gives as a reliable and easily applied test for the detection of cotton-seed oil the behaviour of this oil towards a chloroformic solution of gold chloride (1 gm. to 200 c.c.), and asserts that it will indicate *one per cent.* in admixture with olive oil. The procedure is to take 5 c.c. of the oil with 10 drops of the gold chloride solution and heat for twenty minutes by placing the test tube in a vessel containing boiling water, a red colour indicating the presence of cotton-seed oil. With a view of confirming this apparently valuable test numerous samples of commercial oils were obtained, on which, however, little reliance for purity could be placed; from Mr. Geo. M. Behringer were received samples which he believed to be pure, based upon confidence placed in the producer as well as upon tests made with the samples; other samples were gotten in the chemical laboratory by means of solvents.

Before giving the results in detail it may be well to state that the test which Hirschsohn claims as so characteristic for cotton-seed oil was also obtained with the oils of arachis, ben, poppy, (an imported oil), sesame and walnut kernel. To ascertain if these oils were contaminated with cotton-seed oil, or probably contained a common principle, their effect upon silver nitrate solution was tried, using the method of O. Hehner (*Analyst*, September, 1888, and *Amer. Journ. Pharm.*, 1888, 575), 1 gm. silver nitrate, 200 c.c. alcohol, 40 c.c. ether, 0·1 gm. nitric acid; the oil with half its volume of this solution was kept in a water-bath at 100° for fifteen minutes, noticing the effect produced in this time. It was found that some fixed oils which could not be identified at the end of this time could be distinguished by heating for one hour in the same way, noticing the effect, and then cooling by placing in a vessel of cold water. The prolonged heating had, in addition to the colour imparted, the effect of rendering most of the oils more viscid, while some of them became almost, others quite solid. The oils giving the red colour with gold chloride behaved differently with silver nitrate, indicating that they were not identical.

For comparison the oils examined are divided into three groups; 1, *pure oils*; 2, commercial oils corresponding to those of group 1; 3, commercial oils of which no *reliable* specimens were examined, and hence cannot be commented upon.

In giving the results of the reagents with Au Cl_3, the time of observation was twenty minutes, if a colour appeared sooner, the time is given; with silver nitrate, *a* indicates the effect in fifteen minutes, *b* in one hour.

1. Pure Oils.	Au Cl_3.	Ag NO_3.
Almond	No change.	*a*, light brown; *b*, red colour.
Arachis	Red in 3 minutes.	*a*, dark red colour; *b*, dark gray green, almost solid.
Ben	,, ,, 5 ,,	*a*, no change; *b*, brownish.
Burdock fruit	Precipitate of met. gold.	*a*, green brown, precipitate; *b*, very dark brown.
Corn	,, ,, ,, ,,	*a*, dark red colour; *b*, precipitate.
Cotton-seed 1	Red in 5 minutes.	*a*, gray green, precipitate; *b*
,, ,, 2	,, ,, 3 ,,	*a*, ,, ,, ,, *b*
,, ,, 3	,, ,, 5 ,,	*a*, ,, ,, ,, *b* — no change.
,, ,, 4	,, ,, 4 ,,	*a*, dark ,, ,, *b*
,, ,, 5	,, ,, 3 ,,	*a*, gray ,, ,, *b*
Hemp-seed (dark)	Indistinct dark colour.	*a*, dark green colour; *b*, no change.
Lard	No change.	*a*, no change; *b*, gray black precipitate.
Mustard	,, ,,	*a*, green black, precipitate; *b*, no change.
Olive, Mottet, (4 years old)	,, ,,	
,, ,, (6 mos. old)	,, ,,	*a*, greenish, slight ppt.; *b*, no change.
,, Lucca	,, ,,	
,, Kimball	Slight precipitate of Au.	*a*, greenish; *b*, solid.
Peach-kernel	No change.	*a*, light brown; *b*, grey black, precipitate.
Poppy-seed (imported)	Red in 3 minutes.	*a*, light brown; *b*, solid.
,, ,, 2. (fresh)	Precipitate of met. gold.	*a*, dark brown; *b*, ppt.
,, ,, 3. (old)	,, ,, ,, ,,	*a*, black, ppt.; *b*. dark brown, ppt. — remain liquid.
Rape	No change.	*a*, dark green; *b*, precipitate.
Sesame	,, ,,	*a*, green black, precipitate; *b*, no change.
Sophora	,, ,,	*a*, light brown, precipitate; *b*, dark green, precipitate.
Sun-flower	,, ,,	*a*, greenish; *b*, dark red brown.
Walnut-kernel, American	Red in 2 minutes.	*a*, brown colour; *b*, green black, precipitate.

It will be seen that most of the oils give dark colorations or precipitates with silver nitrate, so that this test can not be used to indicate positively the presence of cotton-seed oil; there is, however, with cotton seed oil always a grayish film separated on the sides of the test tube; with mustard and rape oils a film is formed which is of a black colour, the colour being due possibly in the first case to metallic silver, in the second case to sulphide of silver.

Arachis oil with silver nitrate develops in a few minutes a red colour which then passes into a dark brown in the course of fifteen minutes; this test is apparently characteristic for arachis oil among the vegetable oils, but is also given by some of the fish oils.

* A Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy. Read at the Pharmaceutical Meeting, January 15. From the *American Journal of Pharmacy*, February.

2. *Commercial oils.*

	Au Cl_3.	Ag NO_3.
Almond 1	Red in 5 minutes.	Red colour, *a*, dark; *b*, very thick.
„ 2	No change.	*a*, pale brownish; *b*, gray black, precipitate.
Arachis	Red in 3 minutes.	Red colour, *a*, dark; *b*, brown black, solid.
Lard 1	No change.	*a*, no change; *b*, brownish black, precipitate.
„ 2	„ „	*a*, no change; *b*, gray black, precipitate.
Mustard	„ „	*a*, dark, precipitate; *b*, dark green, precipitate.
Olive 1 (green)	Red in 3 minutes.	*a*, pale brown; *b*, dark red brown.
„ 2	No change.	*a*, greenish; *b*, solid.
„ 3	Red in 3 minutes.	*a*, grey green, precipitate; *b*, no change.
Poppy-seed	„ „ „	*a*, pale brown; *b*, pale yellow, solid.
Rape	No change.	*a*, dark green precipitate; *b*, no change.
Salad	Red in 3 minutes.	Red colour, *a*, green precipitate; *b*, grey black, thick.

3. *Commercial oils.*

	Au Cl_3.	Ag NO_3.
Castor 1	Slight precipitate of gold.	*a*, reddish; *b*, fluorescent, dark red, thick.
„ 2	No change.	*a*, reddish; *b*, fluorescent, dark red, thick.
Croton	„ „	*a*, no change; *b*, dark green, solid.
Cod liver 1	Red in 4 minutes.	*a*, dark brown; *b*, no change.
„ 2	Slight precipitate of gold.	*a*, pale red; *b*, gray brown.
Fish (good sample)	Dark red in 20 minutes.	*a*, dark red; *b*, no change.
Neatsfoot 1	Red in 12 minutes.	*a*, greenish; *b*, solid.
„ 2	No change.	*a*, yellowish; *b*, brownish, solid.
Linseed (cold present)	„ „	*a*, brown colour; *b*, gray black, precipitate, thick.
„ 2	Red in 3 minutes.	*a*, red brown; *b*, dark brown, thick.
„ 3	No change.	*a*, no change; *b*, yellowish green, precipitate thick.
„ 4	„ „	*a*, no change; *b*, greenish, precipitate thick.
Sperm 1	Red in 5 minutes.	*a*, brown; *b*, no change.
„ 2	No change.	*a*, light brown; *b*, green black, precipitate.

Cotton-seed oils may differ in the rapidity with which they react with both Au Cl_3 and Ag NO_3, this no doubt being due to the manner and completeness of the purification of the oil by chemicals; there is also a difference in their behaviour to sulphuric acid. To ascertain something of the nature of the body giving the reaction with Au Cl_3, a portion of cotton-seed oil was mixed with alcohol and some pieces of potassium hydrate; after shaking a few minutes a clear solution was obtained which was poured off from the undissolved potassium hydrate into a large volume of water; by this means the unsaponified oil was again separated, the soap remaining in solution; the separated oil was now saponified and from the two soap solutions were precipitated the fatty acids. The acid obtained from the easily saponified portion of the oil contained a liquid and a solid portion which could be separated by cooling the mixture. With Au Cl_3 a very fine red coloration was produced. The acid from the more difficultly saponified portion of the oil was solid and gave only a momentary red colour, changing into a violet and depositing a dark precipitate. The cause of the red colour is hence to be found in the liquid acid.

Attention should be called to the difference between the poppy-seed oils. No. 1 is an imported oil, Nos. 2 and 3 were made from black poppy-seed by expression. The difference is so great that the oils were possibly made from different kinds of seed, the imported probably from white poppy-seeds.

Regarding these oils, some show adulteration: almond, 1 with arachis oil; almond, 2 with peach-kernel oil; olive 1, the adulterant possibly a mixture; olive 3, with cotton-seed oil; salad, a mixture of arachis and sesame oils.

Finally a few mixtures of olive and cotton-seed oils were made containing 1, 5 and 10 per cent. of the latter oil and subjected to the gold chloride test; the 10 per cent. mixture gave on warming for twelve minutes a red colour, very distinctly; the 5 per cent. mixture did not react in twenty minutes, but if heated for one-half hour slowly deposited a precipitate of metallic gold; the 1 per cent. mixture showed no colour whatever with gold chloride but with silver nitrate gave a slight deposit on the sides of the test tube. The separation of metallic gold by a number of the oils is probably traceable to the amount of reducing acid present being insufficient to give the red colour.

THE AZORES AS A WINTER RESORT.*

BY EMERSON WARNER, M.D.

(*Concluded from page* 672.)

Caldeira de Pedro Botelho, or, as the natives call it, Boca do Inferno, a name suggestive and very appropriate, shoots what little water it contains with even, recurrent spurts and emits large quantities of gases at each pulsation. The water is intensely acid, and the sides of the pit are covered by a fine grey siliceous mud, much sought after by the peasantry for topical use in cases of stiffened joints and skin diseases. A sample of this mud, from which all trace of sulphate of lime has been eliminated, presented these results on analysis:—

* From the *Boston Medical and Surgical Journal.*

Silica	61·23
Alumina	25·41
Peroxide of iron	0·90
Lime	0·51
Manganese	8·47
Potash	1·33
Soda	0·41
	98·28

The thermometer, quickly plunged into a bucket of this muddy water taken from the mouth of this Caldeira, indicated 98·5° C. (208·40° Fahr.), but the temperature is probably higher. A litre of evaporated water gave a dry residue weighing 1·003 grams, which on analysis showed—

Sulphate of soda	·651
Sodic alum	·087
Sulphate of lime	·034
Sulphate of iron	traces
Silica	·300
Chlorohydric acid	·012
Sulphuric acid	·003
	1·087

Agua Azeda. This water is of the ferro-saline type, delicious to the taste and tonic in its effect. Its temperature is 60·80° F., and it flows at the rate of 11·2–5 gallons per minute. A litre submitted to ebullition lost 930 cubic centimetres of gas, composed of—

			equal to
Carbonic acid	890	Carbonic acid	95·7
Nitrogen	35	Nitrogen	3·7
Oxygen	5	Oxygen	0·6
	930		100·0

A litre of this water evaporated left a residue weighing 0·334 gram, which gave—

Bicarbonate of soda	·170
Bicarbonate of lime	·010
Bicarbonate of iron	·008
Sulphate of soda	·040
Sulphate of potash	·004
Chloride of sodium	·067
Silica	·091
	0·390

Padre José, temperature 123·80° Fahr. A litre of this water submitted to ebullition lost 102 centimetres of gas, made up as follows:—

Carbonic acid	86·3
Nitrogen	12·0
Oxygen	1·7
	100·0

and a detailed analysis gave—

Bicarbonate of soda	·214
Bicarbonate of lime	·031
Bicarbonate of iron	·020
Sulphate of soda	·114
Chloride of sodium	·113
Silica	·201
Sulphydric acid	traces
	0·693

One of the largest of the Quenturas baths wells up at the rate of 38 gallons per minute, temperature 118·40° Fahr., and is drawn off into reservoirs for use as required. A litre submitted to ebullition lost 200 cubic centimetres of gas, composed of—

Carbonic acid	192·5
Nitrogen	6·0
Oxygen	1·5

An evaporated litre left a dry residue, weighing 1·014 grams, which on analysis, showed—

Bicarbonate of soda	·956
Bicarbonate of lime	·008
Bicarbonate of iron	·008
Sulphate of soda	·026
Silica	·192
Chloride of sodium	·111
	1·301

A public bath-house has been built in the valley of the Furnas—a nice, large, commodious and somewhat expensive building. It contains some sixty bathrooms, with dressing-room attached to each; a marble bath-tub cut from a solid block set in the floor, and supplied with hot and cold water of iron and sulphur, so that a bath of any temperature desired, of either sulphur or iron water, can be had, or a mixture of each. Each room has tiled floor, electric bell, suitable chairs, table, etc. The services of a janitor can always be had—a female attendant when necessary—and for all this there is no charge. A tip to the janitor or attendant is all that is expected. As yet there is no physician in attendance, save in the months from June to September, when two from Ponta Delgada serve a month each in turn for the time specified. They are taken from the hospital at Ponta Delgada, and a small hospital under the same management is located near this bath-house, which they use for such patients as they choose and think may receive benefit from such treatment.

An official report to the government is expected from these physicians each year.

It is easy to see that this imperfect service cannot be productive of very valuable results.

This locality, so abounding in nature's products of sanative qualities, needs cultivating. This wealth of material running to waste night and day, if rightly appropriated, might be a boon to many who are afflicted and whose ailments might here find relief.

From the imperfect and unsatisfactory reports that have thus far been given, some idea can be had of the classes of cases which have received most attention, and the result. Cases of rheumatism are most numerously treated with the largest percentage of improvement. Next come nervous and skin diseases. Of seven cases of sciatica five were improved. Two cases of dorso-intercostal neuralgia were improved. Of ten cases of paraplegia in rheumatic patients, eight were improved. Five cases of hemiplegia following upon cerebral hæmorrhage, three were improved. Cases of psoriasis, impetigo, lichen were treated successfully. Many forms of dyspepsia are relieved and cured. Cases of anæmia are often greatly benefited. But the use of these waters is still largely empirical, and the great gift which nature has here bestowed on mankind is by no means properly appreciated.

The valley itself in which is found this wealth of mineral water is one of the loveliest spots on earth—rich in extensive and beautiful gardens, summer houses capacious and comfortable, and surrounded by peaks from which the view is entrancing. An old resident of the Sierras said of it in contrast, "While not so grand, it is far more beautiful."

Here Wm. Hickling Prescott spent a part of the year 1816, and wrote his sister, "In this delightful spot I have enjoyed some of the happiest hours that I have spent since I quitted my native shores."

Well may a man in such a retreat as this throw off the cares and burdens which threaten to crush mind and body both, and recover his elasticity, and find peace and health in the surrounding beauties and in the pure atmosphere which here he breathes.

The diseases most prevalent among the natives, as is generally the case, are born of their climatic conditions and climatic surroundings.

The peasant is poor, poorly nourished, poorly clad, has the ground for his cottage floor, a damp climate, a

damp house; these bring their train of ills—general debility, dyspepsia, anæmia, rheumatism, and pulmonary troubles.

Epidemics of severe types of diphtheria, typhoid fever, or other fevers seldom visit the islands.

Malaria is unknown. The middle and higher classes are comparatively free from sickness, and many attain a great age. The natives are nearly all Catholics. A single small English chapel at St. Michael's supplied by a Church of England clergyman from Christmas to Easter, is the only other public service in the islands. A few English speaking people are found in the chief cities. At Horta, Fayal, is the home of our American consul. This office has been in the family over eighty years, minus two years only. Educated largely in our highest institutions, the family is intelligent, cultivated, refined, and keep thoroughly posted in matters that most engage the attention of American scholars and statesmen, and they are tireless in their efforts to entertain and make pleasant the stay among them of American visitors and others.

Many have had occasion repeatedly to return thanks for flowers—souvenirs of their delicate attention and kind regards, from their capacious and well-kept garden of several acres in extent, and containing specimens of nature's varieties of trees, shrubs, fruits, and flowers from nearly every clime.

Nor must the genial Mr. and Mrs. Edwards of Fayal Hotel be omitted. They are large-hearted and generous, quite beyond what is usually seen in those who manage hotels. In Ponta Delgada, St. Michael's, are also to be found pleasant and cultivated English-speaking families, mostly natives of England.

The Portuguese are a polite and courteous people, even to the children. Saint's days and other holidays are frequently observed. Religious processions headed by bands of music, and conveying images of worship, often filled the streets with a gaily dressed throng.

On the whole they seem fairly prosperous and happy. Their increase is much in excess of their ability to maintain, so emigration, mostly of the young of both sexes, constitutes yearly a large export product. It will be seen by this somewhat discursive description that the Azores furnish the tourist or invalid who seeks to escape the rigours of a New England winter with an equable climate and beautiful scenery, among a profusion of flowers and luxurious vegetation.

Springs of fresh and medicinal water are ample in supply, and healthful. A winter residence here should never be sought by the consumptive; but for those suffering from asthma, rheumatism, neuralgia, anæmia, nervous exhaustion, malaria, general debility, the Azores are justly celebrated. The great and sudden changes which belong to our climate even in summer never surprises and shocks the invalid who seeks rest and quiet in these island retreats.

Expenses of living here are very moderate. Barks for Boston are sent out from E. A. Adams and Co., each making the round trip on an average once in ten or twelve weeks. The vessels are not large, but seaworthy—each in command of experienced and skilful officers.

TINCTURE OF MUSTARD.*

BY JOSEPH W. ENGLAND, PH.G.

Internally as an emetic, and externally as a rubefacient, mustard has held popular pre-eminence, as a safe and efficient remedy, from the earliest period; and it is strange to note that, although it has been used with unvarying success in the directions mentioned, any preparations of it have never, apparently, been employed for internal administration.

* Read before the Philadelphia College of Pharmacy, February 10. From the *American Journal of Pharmacy*, March.

It is possible that the disinclination to use preparations of mustard internally may have arisen through a belief that any such compounds must necessarily partake of its emetic-producing properties. This idea is an erroneous one. It is now recognized that the emetic qualities of ground mustard seeds are dependent for their exciting cause upon the minute particles enveloping, or having adherent to them, particles of the acrid and volatile principles of mustard, which act, mechanically, as local irritants to the mucous membrane of the stomach, and thus cause a revulsive action, and that it is not due to any centric influence.

Believing, then, that mustard in the form of a tincture, would possess valuable stimulating properties, the writer prepared, over a year ago, an alcoholic preparation of this drug and urged its medical employment, especially in those conditions which are graphically expressed by the term "drunk-cases." It was found to answer admirably. Possessing the aromatic qualities of ginger and the sharply stimulating properties of capsicum, it combined in one the excellencies of both, without the local irritant feature so characteristic of capsicum. It was found to be stronger than tincture of ginger and less active than tincture of capsicum; standing, apparently, midway in medicinal activity between the two.

Mustard, as is well known, depends for its medicinal activity upon a fixed acrid oil—acrinyl sulphocyanide, and sulphate of sinapine, in the case of the white seed, and a volatile liquid,—allyl sulphocyanide in the case of the black seed. None of these principles pre-exist in the seeds as such, but are the results of decomposition by a ferment— myrosin—in the presence of water, of certain proximate principles, sinalbin in the one instance and sinigrin in the other, very much in the same way that amygdalin and emulsin in bitter almonds are broken up when brought in contact with water, to form hydrocyanic acid.

In the preparation of the tincture, the ground commercial black mustard seed which has had the larger portion of its 20–25 per cent. fixed oil removed by pressure, has been used. The formula is as follows:—

Take of

Ground black mustard . . .	8 troy ounces.
Water	2 fluid ounces.
Alcohol	q. s. ad 1 qt.

Moisten the mustard with the water, added in small quantities at a time, in a porcelain evaporating dish or other non-metallic receptacle, and admix thoroughly Cover well and leave stand for twenty-four hours. Remove and pack in a glass funnel or percolator; add 1 pint of alcohol and macerate for forty-eight hours. Then allow percolation to proceed, keep adding alcohol until the percolate measures 1 quart.

The finished liquid is a clear, transparent, yellow fluid, having a strong characteristic odour and a warm pungent taste. Mixed with water it becomes slightly opalescent or milky from the precipitation of a small quantity of fixed oil. Its dose is from $\frac{1}{4}$–$\frac{1}{2}$–1 teaspoonful well diluted with water.

PREPARATIONS OF MUSTARD FOR INTERNAL USE.*

BY J. M. MAISCH.

Tincture of mustard prepared as suggested by Mr. England, appears to be a preparation deserving the attention of physicians, and it is probable that its effects may vary somewhat as the white or the black mustard is used in making it, and that the tincture of black mustard cannot be fully represented by a solu-

* From the *American Journal of Pharmacy*, March.

tion of the volatile oil of mustard in alcohol. Liquid preparations of mustard for internal use have been employed until the beginning of the present century; but at the present time their use is very limited. Still formulas for such preparations can be found in modern works, most or all of them based upon such as were in use about a hundred years ago.

The 'New London Dispensatory' (edition 1676), after lauding the medicinal effects of *Sinapeos*, states: "Steep'd in Rhenish Wine, and the Wine drank for some Days (lb. 1 to a Quart) it helps the Dropsy *Tympanites*, and is very good against Epilepsies, Carus and Lethargy."

The 'Pharmacopée Universelle,' by A. J. L. Jourdan (Paris, 1828), quotes a number of authoritative formulas, from which the following are selected:—

Vinum Sinapios; *Collutorium Sinapi.*

	1.	2.
Bruised mustard seed	℥ss.	℥j.
White wine	lb. j.	lb. j.
Macerate for six hours and filter.		
Add tincture of cinnamon . . .	—	℥ij.

The first formula is credited to the Würzburg Pharmacopœia of 1796, and the second to Augustine's 'Pharmacopœa Extemporanea' (Berlin, 1822). Used as a sialagogue and internally in dropsies.

Serum Lactis Sinapinum, s. Cum Sinapi.

Cow's milk	lb. ij.
Bruised mustard seed	℥ij.

Boil together until coagulated, then filter.

This preparation is credited to the Pharmacopœias of Holland (1805; Niemann's additions), Hessia (1806), Lippe (1794), and Sardinia (1773). An improved formula recommended by Swediaur (1817) was as follows:—

Cow's milk	lb. j.
Mustard seed	℥j.

Triturate together gradually; then add a sufficient quantity of Rhenish wine, coagulate by heat and strain.

Recommended in arthrodynia, gout and paralysis; one or two pounds are to be consumed during the night.

A number of formulas are also given in which beer or ale is used as the vehicle; but these all contain other drugs in addition to mustard.

Formulas similar to, or identical with the above, are also given in Geiger-Mohr's 'Pharmacopœa Universalis;' but as indicated by the types used for them, these preparations were at that time but rarely employed. Yet in a work as recent as Bernatzik and Vogl's 'Arzneimittellehre' (Vienna, 1886) it is stated that mustard is occasionally, though rarely used, as a diuretic in the form of *serum lactis sinapisatum*, prepared from ground mustard 50 gm. and milk 1 litre.

Dorvault, in 'L'Officine,' quotes only a few of the old formulas, which appears to be rarely, if ever, employed in France. But Hager, in 'Pharmac. Praxis,' gives in addition to various others a formula for

Syrupus Sinapis.

Simple syrup	100 parts.
Spirit of mustard	1 part.

Dose, a tablespoonful, in bronchial catarrh.

Spiritus Sinapis of the German Pharmacopœia is a solution of 1 part of volatile oil of mustard in 49 parts of alcohol.

Aqua Sinapis, which was formerly prepared by macerating black mustard in water and distilling, is recommended by Hager to be made by dissolving one drop of the volatile oil of mustard in 250 gm. of distilled water.

MATERIA MEDICA OF AUSTRALIA.

In a Presidential Address delivered by Baron F. von Müller, before the Pharmacological Section of the Intercolonial Medical Congress held in Melbourne in January last, occur the following interesting passages relating to the possible contributions from the Australian flora to materia medica:—

It might reproachfully be asked, why with such a host of novel plants to experiment on, as we possess in Australia, ampler records of their medicinal properties are not yet extant. But for such purposes real facilities are solely afforded in hospital-practice, and even there only sparingly; because practitioners are hardly justified in their ordinary calls to enter on trials of this kind, unless by preliminary tests on organisms, other than the human, a fair insight has been obtained of what may be expected from any altogether new remedies; and even then, in experiments on higher vertebrata, conflicts may be encountered with some small part of the community, should vivisection require exceptionally to be resorted to. Moreover such experiments are in their results but too often negative, and then rather discouraging. In one direction, however, wide progress has been made; it is this:—the diagnoses of 9000 species of flowering plants of the fifth continent became reliably fixed, whereby simultaneously a firm basis was gained for applied science in all its ramifications, to trace with every accuracy the vegetable products of Australia, including those for medical use, to their specific sources. A commencement has however been made here. Thanks to the erudite aptitude displayed also in therapeutics, by Dr. Bancroft, both species of *Duboisia*, as you know, have been physiologically investigated, of which inquiry advantage was promptly taken in ophthalmic surgery. Let me also remind you here, that one of the best kinds of catechu can be prepared from Australian wattle-bark.

We shall listen with particular interest to the information which will be offered by Dr. John Reid in regard to the active principle of an Australian spurge, rendered pharmaceutically accessible now already on a large scale. The small herbaceous *Euphorbia Drummondi*, here referred to, might almost be considered identical with the *E. Chamaesyce* from the countries at the Mediterranean Sea, one well known already to Dioscorides and Plinius, and specially referred to in their writings. A congeneric herb, *E. pilulifera*, which from the warmer regions of Asia has established itself in Eastern Australia as a weed, seems to be much used as a domestic medicine in China: and, to judge from Australian experiences, has evidently a sedative action on the respiratory organs, having been particularly lauded in asthma. Thus a wide field for inquiry is opened among these kinds of plants, numbering over half a thousand species, variously dispersed through the world, about twenty occurring in Australia, one of them big and cactus-like in the remotest north of Queensland. In the original analysis of the highly acrid "Euphorbium" (obtained chiefly from North-African succulent shrubby species), as instituted by Brandes, and also in some few subsequent analyses, what may be the real effective constituent in the copious resinous compound could chemically not be isolated. Possibly an oily alkaloid may exist in the milk-sap of euphorbia, just as lobeline in that of lobelia. Flueckiger has shown the euphorbon to be closely allied to lactucerin or lactucone. In all likelihood, a very similar principle pervades more or less the milk-sap of all euphorbias, accompanied by modifying other ingredients.

Four large orders of plants, mainly or almost entirely Australian—the Goodeniaceæ, Myoporinæ, Candolleaceæ and Epacrideæ, remain, as regards medicinal or even simply chemical experiments, almost untouched. Whether the bitter principle of some Goodeniaceæ is

merely tonic, and whether the noxious properties of some Myoporinæ have therapeutic significance, remains yet unascertained. Special laboratory arrangements are needed to work with advantage on subjects like these, for systematising from a physiologic point of view, especially when on a new line of investigations we are really without any guidance whatever.

The bitter bark of Riverina and other tracts of East Australia, from *Alstonia constricta*, is locally very celebrated as a tonic, and even as effectual in ague; it was chemically examined in this city, quite independently of the researches of Hesse. Oil of santalum, officinal only since some years, is obtainable in a remarkable proportion from the frâgrant wood of the West-Australian *Santalum cygnorum*.

Leguminosæ—ordinarily the second largest of groups in the universal empire of plants—stand for the purposes of medicinal research next to Myrtaceæ in importance, so far as Australia is concerned, but are in their display of qualities much more varied. Though they yield some plants of great moment for human sustenance and by far the largest portion of alimentary pasture-herbs, yet they include in their wide embrace also some of the most deadly, such as the Calabar-bean. The uninitiated would be lulled into security also here, were he to meet some of the dangerous yet innocent looking members of the order. *Erythrophlæum Guineense*, one of the ordeal-trees of the wild and superstitious hordes of Western Africa, was shown by a Melbourne citizen, when he was in the field many years ago, to have almost its counter-part in an Australian tree of wide tropical distribution (*E. Laboucherri*), whereas quite lately, the existence of a third species (*E. Fordii*) in South-China has been demonstrated. In this genus we have again an admirable example, how we can often argue from systematic affinity also on the utilitarian properties of plants. Thus the erythrophlœine is likewise largely developed in the Australian tree. According to Lewin, a local anæsthesis, extending occasionally to the length of two days, may be produced by it. Some melancholic interest attaches to our Erythrophlœum, because it was the ill-fated Dr. Leichhardt, whose place of perishing is not even yet known, who through his first glorious expedition along the northern portion of the Australian Continent, brought it as "Leguminous Ironbark-tree" under notice, not however suspecting its significance. Indeed, the clue to the virulence of these trees was given by the negroes, who employ their plant also to stupefy fish, just as the Antillians do the bark of the medicinal Piscidia, the autochthones of North America branches of Gelsemium, and the Australian and some other nomads, often sprigs of some Tephrosias and Tribulus for the same purpose. Abrus, even longer known than the Cola, became recognized in its seemingly unique importance only within this decade, first by De Wecker; as a plant of all the tropics it extends also to Australia, where it was noticed already in 1699 by Dampier. Its supreme eligibility in trachoma and pannus were proved also here by Dr. Rudall and other ophthalmic surgeons, notwithstanding some danger of atrophy of the conjunctiva possible to arise from the use of this seed, as pointed out particularly by Knapp and some other surgeons. If I rightly remember, Martius already alludes to some therapeutic power of the Abrus in his 'Specimen Materiæ Medicæ Brasiliensis,' published 1824, soon after his return from South America. Sattler discovered a particular micro-organism, which has been supposed to set up the fermentive inflammation, by which it is sought to destroy the morbid layer. The use of Abrus-seed has latterly been suggested in the treatment of epithelioma. Curious to record, the spores of puff-balls have been recommended for the same purpose. I should forestall the learned and zealous honorary secretary of this section of the Congress, were I to discuss, if even only preliminarily, the interesting data connected with the poison-shrubs of South-Western Australia, species of Gastrolobium and Oxylobium. Dr. Grant will bring before you the new observations, instituted purposely by Dr. Rosselloty at the instance of Dr. Waylen, the Chief Medical Officer of Western Australia; this will be all the more worthy of your attention, as the particular group of these simple-leaved harsh leguminous shrubs is restricted to this part of the world. Let us hope that at a future meeting of the Congress the toxicology of the vetch-like Swainsonas will also become elucidated in the interest of medicine. Moreover, they do not stand alone in this respect, inasmuch as some species of the closely allied genera Astragalus and Lessertia elsewhere are also known to contain powerful principles never yet studied. The cerebral derangements, caused to horses particularly by Swainsonas, especially *S. Greyana*, the feared darling-pea, have long been witnessed, but never been physiologically traced to their origin and in their course. Dr. Frederick Lloyd of this city ascertained in another leguminous plant of ours, the shrubby Goodia, deleterious properties, and even our native Indigofera is held in suspicion, while the use of *Daviesia latifolia* as a substitute for hops is actually forbidden on account of injuriousness. And why do I allude to all this, which may seem foreign to our present subject? Because, as recent therapeutics have given us pilocarpine, duboisine, cocaine, physostigmine, curarine, etc., leaving inorganic substances out of consideration, so we cannot foretell what may be revealed to us for the benefit of therapy, if the indications just given are methodically followed up. Nevertheless, we all feel, that we should be cautious not to burden the stores of materia medica with superfluous additions, such as the *Gonolobus Condurango* of transient glory. It remains a remarkable fact, that among the 150,000 kinds of flowering plants of the universal vegetation, only a few cinchonas give us the quinine, for which we have as yet no real equivalent in any other plant through all the wide world. Yes, cinchonas they are a glorious gift! Surgeon-Major Dr. Geo. King, the eminent Director of the Botanic Garden of Calcutta, brought within reach of even the unprosperous millions of fever-sufferers in India the unseparated semi-crude alkaloids inexpensively from Indian plantations, the area of which is now perhaps larger already than the whole remaining cinchona-forests of South America. It might in addition be added here, that through the whole of East Australia in temperate, frostless mountain-regions cinchonas might be reared millionfold. Cinchonas ripened even germinable seeds not many miles from Port Phillip. What a capability therefore for wide culture?

Should our amply dispersed Myriogynes be compared, on account of their sternutatorian properties, rather to Convallaria than to Arnica, the natural affinity being largely with the latter, or does the Myriogyne possess properties of its own? Could leptandrin, as an American chologogue of recent introduction, be obtained from our own similar veronicas and also from those of New Zealand? Ought the particular Gratiola which fringes here our brooks remain unnoticed, when the European ranked amongst the foremost hydrogogues in the widest sense of the word through three centuries, so much so that the name "gratia dei" was applied to this herb, as significant as that of "Cascara sagrada" for *Rhamnus alnifolius*? What is the precise therapeutic relation of our Boronias and Eriostemons to the allied bucco-bushes of South Africa? Can senna be obtained from any of our Cassias? Can we dispense with chirata by using our own erythræa here? Can the very potent acrid principle of the palm-like Cycas and Zamia-species be chemically defined, having hitherto, like the active ingredient of croton-oil and of many delicate fragrances, eluded separation as distinct substances? Are the alkaloids and the aromatic oils

of the four Australian Monimiaceous sassafras trees from as many colonies closely akin? What is the precise position of the seed of *Cassia Absus*, used for ophthalmic complaints already by the ancient Egyptians, in the therapeutic system, this plant extending naturally to Queensland? Do any of the Australian species of Croton yield an oil comparable to that of the Indian *C. Tiglium*? In what way does the blue-flowering grass-lily of Western Australia (*Agrosto crinum*) affect the visual apparatus of sheep feeding on this plant, so as to cause blindness, and what conclusion can be drawn therefrom? What is the nature of the intensely bitter principle in some of our Pittosporums? How far can Australian lobelias replace *L. inflata*? Can possibly cocaine be obtained from the two species of Erythroxylon, peculiar to tropical Australia? Have the powerful properties of Zygophyllum and Didiscus, manifested by their action on pasture-animals, any counteracting value in some of the morbid affections, with which the therapeutist has to cope?

Such are some of the questions, which to solve on our lines of research devolves especially on us as Australians. Let us strive by united efforts all over this great land of ours to put together an Australian Materia Medica, not a mere collection from vague traditions or crude empiricism, but supported by all auxiliaries of recent medicine, biology and chemistry, so as to render such an opus worthy of our time and of our country.

ODORIFEROUS INSECTS.

Mr. G. A. Farini, in his work entitled, "Through the Kalahari Desert,"* relates the following interesting fact, which may possibly put some of our readers on the track of a new perfume :—

"Three days' easy going brought us to Ghanze without any notable incident. As we drove to the water, the fore-wheel of my waggon crashed into a bush, which at once gave out a *powerful and delicious* perfume. Jumping down to examine the cause, I plucked some leaves, but found they were scentless, as was also the stem of the plant. I could not make out where the pleasant odour came from until I touched a small *beetle*, when out came a puff stronger than ever. The little bug was an animated perfumery store, emitting the delicious scent whenever disturbed. I caught three of them, and put them in a perforated box, in which they lived for a week, the movement of the waggon affecting them sufficiently to make them give up their fragrance in such quantities as to keep the waggon perfumed like Rimmel's. When they died, the scent died with them."

Upon this the Editor of the *American Druggist* remarks:—

It is true that the locality where these remarkable insects were met with is rather out of the way, being situated in about 21·45°S. and 21° E. (of Greenwich), between what is known as Demara Land, and Khamas Land. But as the author is known to be reliable, and has brought back so many other remarkable novelties, there is no reason to doubt the existence of the "perfumed" insect.

Commenting upon the foregoing extract in the *American Druggist* for March, Mr. J. U. Lloyd, of Cincinnati, says:—

"In this connection I desire to call attention to the fact that in this country we have an insect which is probably well known to entomologists, and which is also a 'perfumed insect.' This insect is familiar to persons whose occupations bring them about the rivers and streams of this section of the country, and probably is common elsewhere. Its common name is 'write my name,' so called from the curious manner in which it runs or swims about the surface of the water with great rapidity, especially when disturbed. I do not know its proper systematic name. It is of a dark brown colour, and occurs in little schools along the edges of our streams where the current is not swift. These insects, when disturbed, exhale, while young, a fruit-like fragrance, which is likened by some persons to the odour of early harvest apples, and it is quite pleasant. If they are caught and held in the hand, they impart this odour to the latter, and it seems as though the irritation excites them to emit it. When they are old, or at least very large, they exhale a much stronger, indeed an unpleasant odour."

Some additional notes on the subject are also furnished to the same journal by Mr. W. C. Wood, of New York:—

"Few persons who are accustomed at all to observe natural objects can have failed to notice that many insects are perfumed, or odoriferous. The latter word is, perhaps, the more applicable, since the odour of many insects is anything but perfume.

"In the case of such as live in waste and decaying animal matter the odour is the result of their food and surroundings, but with many insects there is no such cause for it, and we must suppose that they have been endowed with a special perfume for some useful or necessary purpose. Thus we find many insects which are, apparently, protected from their enemies by their pungent or fetid odour. A small blue and yellow beetle (*Brachinus fumans*) is accustomed, when disturbed, to discharge from its anal opening a cloud of bluish vapour, accompanied by a sharp report, from which it has been popularly named the Bombardier. This vapour, which is a liquid volatized by contact with the atmosphere, has a suffocating smell, and burns the fingers quite severely if the insect is picked up. The large green beetle (*Calosoma scrutator*) which is often to be seen running over sunny places, has a very peculiar fetid odour, as have almost all the other members of that family (Carabidæ).

"With some insects their perfume seems to be useful as a sexual attraction. As an instance of this may be mentioned the case of a large black wood-boring beetle (*Prionus laticollis*) which possesses a wonderful odour, very nearly resembling that of musk. The females are more noticeable in this respect than the males, their perfume being so strong as easily to be perceived by a person when several yards distant. The pretty yellow and black striped beetle (*Cyllene robiniæ*), whose grub is so destructive to our locust trees, has a very strong and peculiar odour, which scarcely resembles any other, unless it be that of phosphorus. The beetles feed in numbers on the Golden-rod (*Solidago*) in September, and very much resemble the striped hornets which are also found there frequently.

"The odour of many insects closely mimics that of various vegetable substances. Thus the common brown wasp resembles in smell the vanilla and tonka beans, as do also several species of the brightly coloured tiger beetles (*Cincindelæ*), which run and fly along sunny roads and shores. A large shining bronze beetle (*Osmoderma eremita*), often found in old orchards, has the perfume of a ripe peach, and a little blue and green ground beetle (*Chlænius nemoralis*) that of the butternut. The blackish 'squash-bug' (*Corcus tristis*) has an odour somewhat resembling that of the pine-apple. This insect, when disturbed, has a curious way of tilting itself to one side and throwing out a fine spray of volatile, and probably irritating liquid from pores all along its abdomen. It is sufficient, in closing, to mention one more bug, the *Cimex lectularius*, which, although best known for its blood-loving propensities, has also a peculiar and distinctive odour."

* Published by Sampson Low, Marston, Searle and Rivington, 8vo, London, 1886, p. 251.

INLAND REVENUE ORDER RELATING TO ALCOHOLIC PREPARATIONS FOR EXPORTATION.

Inland Revenue Office, Somerset House,
London, W.C., March, 1889.

The Board having had under further consideration the regulations prescribed by the General Order of the 26th November last, under which certain tinctures, liniments, and medicinal spirits (hereinafter referred to as "tinctures") may be exported, and repayment allowed of the duty on the spirits estimated to be lost in the manufacture of such tinctures, etc.:—

Ordered,

1. That the tinctures be allowed to be packed in cases containing two or more complete bulk gallons, instead of five as heretofore.

2. The size of the bottles containing the tinctures may range from a quarter of a pint to half a gallon, instead of from one pint to half a gallon, as heretofore, and the bottles may contain any of the following quantities, viz.:—¼ pint, ½ pint, 1 pint, 2 pints, or 4 pints.

3. The Form No. 111–4 is to be revised by the addition of a column in which the actual alcoholic strength of the tinctures in terms of proof is to be entered by the rectifier or compounder exporting them.

A corresponding additional column is also to be added in the Officer's book.

It should be stated on the Form 111–4 whether Bond has been given for the due exportation of the tinctures, what is the place of destination, and what the value of the goods. The forms sent to the Customs should be addressed to the Collector of Customs at the port where the goods are to be shipped. An abstract of the despatch (Form No. 100–6) is to be sent by the officer to "The Principal of the Statistical Office, Custom House, London."

4. One sample out of every ten, or fraction of ten, kinds of tinctures prepared at each of the two initial strengths, is, as a rule, to be taken by the officer, instead of a sample of each kind as heretofore; in the case of sweet spirit of nitre and the several kinds of spirit of ammonia, one sample in every five cases is, however, to be taken. A larger proportion of samples may, however, be taken should the officer, in his discretion, consider it necessary. The quantity taken for a sample is in future to be one gill.

5. If on examination of samples at the laboratory the strength is found to vary by not more than two degrees from that declared by the rectifier or compounder, the declaration will be regarded as correct, and drawback, etc., allowed accordingly.

6. If the strength found be less, by more than two degrees, than that declared, a deduction to the extent of the difference, and a further deduction of one degree, is to be made in calculating the proof quantities of all the tinctures of the same initial strength in the consignment, but if the difference amounts to 5 degrees, double that difference is to be deducted from the laboratory strength in calculating the proof quantity.

7. In future medicinal tinctures of every sort may be exported, in cases containing a minimum quantity of two gallons, under the provisions of the General Order of November 26, 1888, as now amended, but tinctures not included in the list appended to that Order, or in the Supplementary List issued herewith, will be entitled to drawback and the allowance of 4*d.* per gallon only, but not to the special allowance for waste granted in respect of tinctures included in those lists.

8. A special Form of General Bond, No. 294, has been provided for use in respect to the exportation and shipment of tinctures under the regulations contained in the General Order of November 26 last, as now amended. A supply can be obtained on requisition to the Controller of Stamps in the usual way.

9. A list of the additional tinctures in respect of which the special allowance at the rate of 4 per cent. for waste may be granted, in addition to the drawback and allowance given on the exportation of ordinary compounds, is annexed hereto.

By the Board, ROBERT MICKS.

Additional schedule of tinctures, liniments, or medicinal spirits in respect of which the special allowance of 4 per cent. for waste may be granted, under the provisions of the General Order of November 26, 1888, as now amended.

Brit. Pharm., 1885.
Ext. Cimicifugæ.
,, Cocæ.
,, Rhamni Frangulæ.
,, Sarsæ.
,, Taraxaci.
Spirit. Ammon. Fœtid.
,, Armoraciæ.
Brit. Pharm., 1867.
Tinct. Castorei.
,, Cinchon. Flav.
Pharm. Lond.
Tinct. Aloes Co. (1851, Ph. Lond.).
Tinct. Rhei Co. (1851, Ph. Lond.).
Spirit. Ammon. Comp. (1836, Ph. Lond.).
Pharm. Edinensis.
Tinct. Cuspariæ.
French Codex.
Tinct. Colchici Cormi.
Russian Pharm.
Tinct. Maticæ.
Prussian Pharm.
Tinct. Colocynth.
Brit. Pharm. Conference Formulæ.
Tinct. Benzoini.
,, Bryoniæ.
,, Calendulæ.
,, Capsici Fort.
,, Convallariæ.
,, Coto.
,, Ergotæ Ammon.
,, Erythrophlœi.
,, Eucalypti.
,, Euonymi.
,, Hamamelidis.
,, Hydrastis.
,, Prun. Virg.
,, Strophanthi.
Lin. Opii Ammon.
Unofficial Formulæ.
Tinct. aconit. fleming.
,, agarici.
,, alstoniæ.
,, ammoniaci.
,, anacardiæ.
,, anthemidis.
,, aurantii rec. fort.
,, balsam. peru.
,, boldo.
,, canellæ.
,, cascaræ.
,, cocæ.
,, condurango.
,, delphinii.
,, eriodyctionis.
,, galbani.
,, guaiaci.
,, guaranæ.
,, hellebor. nigr.
,, ignatiæ.
,, ipecac.
,, koroniko.
,, limonis rec. fort.
,, moschi.
Tinct. myrrh. cum borac.
,, pulsatillæ.
,, quebracho.
,, quillaiæ.
,, vanillæ.
,, warburgii.
Extracts.
Ext. aconiti fluidum.
,, arnicæ.
,, belladonnæ.
,, buchu.
,, calendulæ.
,, calumbæ.
,, cannabis indicæ.
,, capsici.
,, castanæ.
,, chimaphilæ.
,, chiratæ.
,, cinchonæ flav.
,, colchici rad.
,, colocynthidis.
,, conii fruct. fluidum.
,, corn. florid.
,, cubebæ.
,, cypripedii.
,, digitalis.
,, dulcamaræ.
,, eucalypti.
,, euonymi.
,, gelsemii.
,, gentianæ.
,, grindeliæ robustæ.
,, guaranæ.
,, hæmatoxyli.
,, hamamelidis.
,, hydrastis.
,, hyoscyami.
,, ipecacuanhæ.
,, juglandis.
,, krameriæ.
,, leptandræ.
,, lupuli.
,, maticæ.
,, nucis vomicæ.
,, podophylli.
,, pruni virginianæ,
,, quassiæ.
,, rhei.
,, rubi.
,, rumicis.
,, sanguinariæ canadensis.
,, scillæ.
,, scutellariæ.
,, senegæ.
,, sennæ.
,, serpentariæ.
,, spigeliæ.
,, stillingiæ comp. (as Mc Dade's).
,, stillingiæ sylvaticæ.
,, stramonii sem.
,, taraxaci.
,, tritici repentis.
,, uvæ ursi.
,, valerianæ.
,, veratri viridis.
,, zingiberis.

The Pharmaceutical Journal.

SATURDAY, MARCH 30, 1889.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

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THE USE OF METHYLATED SPIRIT BY CHEMISTS.

SOME feeling of apprehension has been excited amongst chemists by the terms of the General Order issued by the Board of Inland Revenue dated the 21st July, 1888, to the effect that retailers of methylated spirit desiring to use such spirit in any art or manufacture must first obtain the authorisation of the Board, and also give a bond as security, in accordance with section 120 of the Spirits Act, 1880, that they will not use the methylated spirit for any other purpose, and that they will observe the provisions of that Act and the prescribed regulations. According to the view then taken by the Inland Revenue authorities, the preparation of belladonna or aconite liniments with methylated spirit was held to be an art or manufacture within the terms of the Act. Consequently any chemist called upon to supply those articles for veterinary purposes, or, as is sometimes the case, for use in hospitals, would have been unable to do so lawfully, if he were also a retailer of methylated spirit, unless he had complied with the conditions specified in the above mentioned General Order or had procured the liniments from a wholesale house. Reference was made to this subject in the Journal of the 12th January, and we then suggested that it was scarcely reasonable to assume that the making of aconite or belladonna liniments constituted an art or manufacture of the kind contemplated by the restrictions imposed on the use of methylated spirit by the Spirits Act. Our reasons for taking that view of the matter were, in the first place, that the making of these liniments and similar preparations does not involve the purification of the spirit or any alteration of it which might by improper use be conducive to a defrauding of the revenue. It was only in regard to arts and manufactures in which such alteration or purification of the methylated spirit take place that the restrictions of the Act were imposed or were indeed required. The chemist who makes, when required to do so, a few pints of these liniments with methylated spirit, does not purify the spirit, or, in the meaning of the Act, alter it so as to render it capable of being used as a beverage, and therefore there is no reason for making him subject to the restrictions which were devised in that respect for the protection of the Revenue. There is secondly a still stronger reason in our opinion for regarding the making of the liniments in question as not being an art or manufacture of the kind contemplated by the Spirits Act. None of those preparations are in themselves capable of being used as a beverage, and we venture to think that they are equally incapable of being used internally as medicine. If that be the case, the very terms of the Spirits Act would appear to show that the Act does not apply at all to such preparations, and if they are outside the scope of the Act, there is no ground whatever for subjecting the makers of them to restrictions which are intended for another purpose altogether. But however this may be, there is no doubt that a very different view of the matter was taken by the Inland Revenue authorities, and that the intention of making the provisions of the Spirits Act apply to such cases was, for a time, seriously entertained by them. If that course had been followed out, much inconvenience must have been caused.

Two weeks ago we intimated that there was reason to believe such an extreme application of the Spirits Act would not be enforced, and we are glad now to be able to state authoritatively that this is really the case. The Inland Revenue authorities, in consideration of representations that have been made to them, have resolved to make an exception to their General Order of the 21st July, 1888, which will be found in the Society's Calendar at page 302, and to allow the use of methylated spirit for the preparation of aconite, belladonna, soap and compound camphor liniments by retailers of that article without subjecting them to the restrictions provided by the Spirits Act in respect to its use in any art or manufacture. In a General Order that has just been issued and bearing date the 22nd of this month, the attention of the officers of the department throughout the country is directed to this decision, and they are instructed that the regulations prescribed in the previous General Order are to be regarded as inapplicable to the making of the above mentioned liniments with methylated spirit. Practically therefore all ground for apprehension of inconvenient interference with chemists in that respect is now removed, and we are glad to be able to furnish the information that the matter has been satisfactorily settled. It will be observed that the Board of Inland Revenue takes the position of granting a concession in favour of chemists, and under the circumstances it would be ungracious to take exception to the mode in which this result has been arrived at or to raise any contention as to the discretionary power exercised by the Board of Inland Revenue. But we cannot abstain from stating that with full appreciation of the considerate action of the Board we do not perceive any reason for abandoning the view already put forward in this Journal on several occasions that the liniments in question are altogether outside the scope of the Spirits Act, and that they are so because they are not of the nature of the articles to which that Act

specially relates, viz., articles capable of being used as a beverage or internally as medicine. We must, however, add that the Inland Revenue authorities do not admit that these preparations are quite incapable of being used internally as medicine, and it is upon that ground they claim the right to exercise control over them and to constitute the making of them an exception to the application of the Act. It may be hoped that in regard to the sale of medicinal wines by chemists a similarly satisfactory means of providing for all requirements may be eventually devised, so as to obviate the very undesirable necessity that at present exists of having to take out an excise licence for their sale.

In connection with the approaching exhibition in Paris it has been proposed to hold an International Congress of Therapeutics and Materia Medica. A committee of organisation has already been formed, of which M. Moutard Martin is President, Dr. Dujardin-Beaumetz Vice-President, M. Constantine Paul General Secretary, and Dr. P. G. Bardet Assistant General Secretary. The Secretary of the Section of Therapeutics is M. Labbé, and the Secretary of the Materia Medica Section M. R. Blondel. The meetings of the Congress will take place in Paris at the house of the Sociétés Savantes, 28, rue Serpente, from the 1st to the 5th of August next, and medical men, pharmacists and veterinarians can become members of the Congress on payment of a subscription of ten francs. Several subjects have been selected for discussion, among which are the analgesic and antithermic remedies lately introduced; antiseptics and their special action on different species of pathogenic microbes; heart tonics; new drugs of vegetable origin; the assimilation of weights and measures on one system, and the utility of an international pharmacopœia. Members of the Congress who intend to bring forward communications are requested to give notice to that effect and to send the titles of their papers to the secretary of the organizing committee before the 15th of May next. The papers brought before the Congress and the discussions that take place will be published in a volume under the care of the Committee and distributed to each member. There is also to be an exhibition of drugs relating to the subjects selected by the Committee, which will be held at the place of meeting, and remain open while the Congress is sitting. This will be carried out under the supervision of Messrs. Adrian and Blondel. All communications relating to the Congress are to be addressed to Dr. Bardet, 119bis, rue Notre Dame, des Champs, Paris.

* * *

The latest report of the Pharmacy Board of Victoria states that during the year 1888 fifty-seven persons entered for the preliminary examination, of whom twenty-two passed, and twenty-eight entered for the qualifying examination, of whom thirteen passed; there were also five persons who passed the modified examination. Since the passing of the Act regulating the practice of pharmacy in the colony, in 1876, the total number of persons registered as pharmaceutical chemists has been 937. Since 1879 there have been ninety registered under the certificates of the Pharmaceutical Society of Great Britain, four under certificates from the Pharmaceutical Society of Ireland, and nine on account of foreign diplomas. At the end of December last the Victoria Register contained 735 names.

* * *

The latest report of the Historical Manuscripts Commission, relating to manuscripts preserved at Belvoir Castle, furnishes a curious instance of the possibilities of sixteenth century medicine. From a document, dated January 12, 1582, it would appear that "Richard Batte, late of Burton, next Sturton, Chirurgion" was under suspicion of having procured to be made "a picture of waxe wherbye he would consume his wyfe's mother and all the rest of her children," his object being that "theyre livynge mighte cume to the seyde Bate and to hys wyfe." It seems pretty evident that a "pycture of a maid" in wax had been made, information of which having been laid before "Mr. Meare of Nottingham," Mr. Bate was apprehended and his brother-in-law was bound over to "prosequite the lawe" against him. The case must, however, have proceeded very slowly, for nearly ten years after, in September, 1591, Richard Bate, Surgeon, appears under examination trying to put a very different colour upon the making of the picture and to reduce it to a bit of medical practice. He deposes that he "hath a pacyent in the countrye whose name he wyll not declare, but she ys trubled with a flyxe," and he wishing to provide a remedy consulted a friend as to a "cunnyng man that ould make a proporcyon or figure of a mayde with a garlande on her hedde, and a flower in her hande." The cunning man was found, who promised to make in wax artificially the figure of a maid "with her heare hyngyng syde aboute her shulders," for which his reward was to be an "olde angell." Bates added that it was his intention to have "put therto the powder of a poungarnett or of the shale therof, the powder of synamoun, the powder of redde saundres and the powder of nutmeg, to give to hys sayde pacyent to stey the flux called dissenteria. He wulde have baken the same together with pyppyns, which hys sayde pacyent shalle eate." This is the last reference to the case in these documents and the judicial decision does not appear.

* * *

The prospectus has been issued of what promises to be a most important work on the History of the Principal Drugs of Vegetable Origin met with in India, or 'Pharmacographia Indica.' It is to be the joint production of Brigade-Surgeon W. Dymock, Professor C. J. H. Warden and Mr. David Hooper, all of whom hold official positions that will afford great facilities for carrying out the work and whose names will be familiar to the readers of this Journal. The intention of the authors is to collate and verify the information concerning the drugs and medicinal plants at present scattered through many books and periodicals in various languages as well as official documents, and to supplement this where deficient by the results of original investigation specially directed towards the elucidation of the chemical composition and physiological action of these substances. The work is to be published in this country by Messrs. Trübner and Co., and it is expected that the first part, from Ranunculaceæ to Anacardiaceæ, will appear during the current year.

Provincial Transactions.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The following papers were read before the above Society on the "Students' Night," Wednesday, March 17 :—

Filtration.

BY CHAS. D. MOFFAT.

I chose for my subject to-night that of filtration, thinking it was one likely to be of some interest to fellow students. For the sake of convenience, I have divided it into three sections, in which I will endeavour to describe as briefly as possible a few of the processes involved.

The first question to consider is that of filtering media. Filter paper bags, and apparatus which depend partly upon the use of one or both of these may be called filters proper, whilst the other media, as a rule, act as supplementary aids in combination with a paper filter or bag, and are generally used either by previously mixing with the liquid to be filtered, or by forming a layer or layers on the filter through which the liquid percolates.

Now as to filtering paper. This is found in commerce in two forms, viz., in large and in circular sheets. The formula is sometimes used for lining bags when the bag alone would not give good results, but the latter form is the one which is most convenient for general use. There are two kinds of square sheet paper, the German paper, which is white and rather thin, and the French, which is thick and porous. Of the round filters those in ordinary use are grey, of French manufacture, imported in various sizes, varying from those which are about three inches in diameter to those having a capacity of about four pints. They generally answer very well for all ordinary purposes, but sometimes are of very bad quality, being irregularly cut and unevenly felted, with a few holes interspersed. For special purposes, where the colouring matter present in ordinary papers would be likely to prove harmful, a white paper of French make will answer very well. The French also make a thick paper specially suitable for syrups, which is yet sufficiently pervious to allow of fairly rapid filtration.

Filtering paper is also manufactured in England and Scotland, but does not appear to be used much at any rate in this country; probably it has been outrivalled by French and German competition.

For analytical purposes the Swedish paper is generally used.

A word as to the preparations for which a paper filter is most suitable. Although its use is mostly confined to small quantities of preparations, there are many things in which it answers just as well, if not better, even for large quantities, than a more elaborate filter.

Examples of this are to be found in such things as infusum quassiæ conc., liquor plumbi subacet., ext. belæ. liq., and the linaments and tinctures taken as a class, in which there is very little suspended matter, and consequently have very little tendency to clog the pores of the filter.

Next we come to filter bags, and here I may say that bag filtration is one of the most important of all, being the one which gives the best all round results for large quantities. The chief reason for this is that the shape of an ordinary filter bag is favourable to rapid filtration, the length being very great as compared with the breadth, and thus we get the same volume of liquid in this form producing a longer column, and consequently a greater pressure, than it would if the filter were in the shape of an ordinary funnel. Bags are made of felt, flannel, calico, and linen, the shape being generally that of an inverted sugar cone. For general purposes flannel and felt are preferable.

It would be impossible to mention all the preparations for which bags are adapted, I will therefore only refer to one or two. For many of the concentrated infusions and decoctions they have no rival. Good results can be obtained with the infusions of gentian, calumba, and senna, especially when made in large quantities, which are not possible in working with small quantities and filtering through paper, from the readiness with which the pores of the latter get clogged up. Quassia can also be filtered through a bag very satisfactorily as well as mist. sennæ co. Of course the *modus operandi* varies according to the nature of the liquid which is being filtered. In some cases merely running the liquid through the bag will be sufficient, in others it has to be returned again and again till it comes bright. Generally it is necessary to use some other medium in combination with the bag, such as magnesia or sand, for the infusions of gentian, calumba and quassia, paper pulp for oxymel scillæ, etc.

We next come to filtering media, other than paper or bags, which aid filtration either by removing finely divided substances which would escape through an ordinary filter were it not for their help by decolorization, or other means.

Those best known are animal charcoal, magnesia, kaolin, pumice, fullers' earth and French chalk, which may be used for the filtration of ordinary preparations, whilst the use of glass, asbestos, rock crystal, and sand is chiefly confined to liquids containing a free acid or alkali. As to the selection of a filtering medium it is impossible to lay down a definite law or to mention any one which gives good all round results. As the conditions which regulate this selection vary to such a great extent, we have to take into consideration two things—the nature of the substance which renders perfect filtration of the liquid difficult, and the likelihood of anything being present in the liquid which would act on the medium we think of using.

As an example we want to make syrup of tolu, say. We proceed as the Pharmacopœia directs up to the point when we are told to filter the liquor tolu. We have perhaps had good results with magnesia in filtering some preparation, and think it will also answer well here. What is the result? The filtrate will at first sight appear perfectly brilliant, but after a short time it begins to go hazy; this is owing to the action of the cinnamic acid present in the tolu upon the magnesia. Had animal charcoal been used this would not have occurred.

This is only one of the many examples of selection of a wrong medium which one finds.

Experience, combined with a knowledge of chemistry, is the only way in which to learn what is the right one to select. With these we can soon decide whether the information given in our text books is reliable; without we shall still continue to perpetuate the errors that are so carefully handed down to us by our predecessors.

To return—animal charcoal is the first on our list. This should be the carbo animalis pur. of the B.P., as it is absolutely necessary that it is as free as possible from impurities present in the commercial bone black. It should always be used with great care, as it possesses properties which might render its use harmful in a great many cases. It acts as a decolorizer, and to a certain extent as a deodorizer, and possesses the property of removing bitter substances, such as aloin, astringents, and alkaloids from solutions containing them, besides excesses of volatile oils from liquids. It is largely used in filters for domestic purposes, and commercially in the process of sugar refining.

The property of decolorizing liquids is possessed by wood charcoal also, but not in such a marked degree.

In both cases there is a limit to the power of absorption of colour, but the charcoal may be restored to its original condition by calcination. It is very useful for many pharmaceutical preparations, such as sp. ammon. aromat., as by its means we obtain a perfectly brilliant filtrate unattainable with any other medium. I have already alluded to its use for syrup of tolu. Of course there are many other instances in which it should be used, but they are too numerous to mention here.

The next is magnesia (or I should rather say magnes. carb. levis., B.P.). This is *the* medium for filtering many concentrated infusions and decoctions. It gives splendid results with gentian, quassia, and calumba particularly, but never more than is absolutely necessary should be used, or in the case of gentian the aroma will be impaired.

Besides these it is sometimes used for some aromatic waters, by reason of its property of absorbing excesses of essential oils in the same way as charcoal, but its use is not advisable, owing to it being slightly soluble in water; hence its presence will interfere with the purity of the preparation for which it is used.

The next four, viz., kaolin, pumice, fullers' earth and French chalk, I will take together, as they possess many characteristics in common. Kaolin is also known as Chinese or porcelain clay, it being obtained by the decomposition of felspar, a silicate of alumina and potash.

The pumice should be in coarse powder, as the fine is liable to clog, whilst the fullers' earth and French chalk should be in fine powder. All of these answer exceedingly well for acetum ipecac., acetum scillæ, and such of the official wines as will not filter brilliant through paper alone, whilst both creta gall. and pumice give very good results with succus taraxaci, which is very hard to filter bright. But of the two, I am inclined to think that French chalk is better for this purpose.

A word as to paper pulp. It may be made either by dissolving in aqua regia and reprecipitating with water, or else by rubbing up to a pulp in a mortar with a little caustic potash or soda and washing with hot water till free from alkalinity.

If used for clarifying a liquid, a little of the prepared pulp is shaken up with it, the whole allowed to settle and then poured off; if for filtering, after addition to the liquid the whole is thrown on to a muslin or flannel strainer; it thus forms a very good filtering bed by filling up the meshes of the strainer.

Another way is to tear the paper into very small pieces, and mix by shaking or otherwise with the liquid which it is required to filter.

It does not seem to be so extensively used in this country as in the United States, where it is by many considered a good all-round filtering agent, not only for syrups, but also for aromatic waters, elixirs, etc.

My experience of it is that it is no better than other media, being, like them, specially adapted for certain things, but failing entirely to answer with others. For many syrups, and also such preparations as oxymel simplex and oxymel scillæ, it undoubtedly does answer very well. In these cases it is best used in combination with flannel. Swansdown is a very useful medium for syrups and liquids containing a large quantity of mucilaginous and albuminous matter; for example, the liquor pro syrup. papaveris alb.

Lastly we come to the means employed for the filtration of strong alkalies. Sand, glass, rock crystal and asbestos are the media in general use.

The sand should be rather large-grained and purified by washing with dilute hydrochloric acid first, and then with water. Besides being used for acids and alkalies, it is to be recommended for some concentrated infusions, notably gentian.

For glass two kinds are wanted: glass wool and glass powder. The ordinary "frost," powdered down, will answer very well for the latter. A permanent filter giving excellent results with liq. potassæ and sodæ, as well as acids, may be made by placing a layer of glass wool in the neck of the funnel, and on this a layer of powdered glass. It should be washed with hot water before being used.

A rock crystal filter may be set up in the same way and is preferable to sand, being the purest natural form of silica, and therefore less liable to be acted upon by liquids.

Asbestos is generally used by tearing into shreds and placing in the neck of the funnel so as to form a loosely compressed plug. The great objection to this is the slowness with which it allows liquids to filter.

A better way is to cut a piece of muslin in the shape of a filter paper, so that it will exactly fit the funnel, and place on this a sheet of asbestos folded like an ordinary paper, and support the two by means of a piece of string tied to the run of the funnel. The muslin keeps the asbestos from breaking and at the same time increases the rate of filtration.

It will be necessary to return the filtrate to the funnel for a short time until it comes bright, after which the filter works very satisfactorily and will last for a long time. It is most suitable for the solutions of potash and soda. I do not propose to dwell on the various apparatus which have been devised for aiding filtration, as there are too many to allow of that, but I may say that a cone of muslin placed beneath the filter paper not only supports it but increases the rate of filtration by preventing adhesion of the paper to the funnel. A cone formed of coarse hair cloth is sometimes used instead. When liquids contain a slimy deposit it is well to have some coarse straining material such as thin flannel placed within the paper filter, as in this case a large portion of the undissolved slimy matter is caught on their rough surface and prevents the paper getting clogged up.

It will be as well to allude here also to the important bearing which the application of heat and allowing a liquid to subside before filtration have on the subject.

As to the former we shall often come across instances in which heat aids filtration. For instance, by causing the precipitation of some finely divided substance which renders filtration difficult, by preventing the formation of deposit after filtration, etc.

Let us take one or two examples of this. Acetum scillæ, when prepared strictly in accordance with the directions given in the Pharmacopœia, soon becomes unsightly, a fungoid growth being formed and albuminous matter deposited. An improvement can be made by means of the following process:—Use whole squills, macerate, strain,—but do not *press*,—then boil; let stand for a few days, and then filter through kaolin.

The object of boiling is to coagulate the finely-divided albuminous matter at once instead of having it come down slowly after filtration. Besides this, it helps to prevent the formation of the fungus.

By boiling the tincture of squill also the process could be much shortened, as by the ordinary method the preparation generally has to stand for about a fortnight after being pressed off before it can be filtered bright, whereas if it were boiled it would deposit at once. Of course precautions must be taken to prevent loss of spirit.

Again, as to vin. colchici, the B.P. does not say that it should be filtered, merely strained, as the presence of albuminous matter is supposed to render filtration very difficult.

This process may also be improved upon by boiling the wine after pressing it off. The effect is very similar to that on acetum scillæ, albuminous matter being precipitated, filtration being thereby facilitated and the fungoid growth prevented.

One more example. This time it is concentrated infusion of quassia. You all know how liable this preparation is of all others to go mouldy; boiling the infusion, of course previously to adding the spirit, will go far to prevent this.

Subsidence is also a very important factor, particularly so in the case of liquids containing a large quantity of starch, succus taraxaci, for instance, and of those containing mucilaginous matter, such as the liq. pro syr. papaveris alb. In a great many cases a large quantity of the liquid can, after subsidence, be poured off without filtration being necessary at all. As examples of this I may mention the liquid extracts of ergot and cinchona; in the case of the latter the subsidence is so complete that the deposit takes the form of a solid cake at the bottom of the bottle, from which the liquid can be easily poured off; also many concentrated infusions and decoctions, especially senega, in the case of which filtration is practically impossible until it has stood for a few days, when much of the infusion can be poured off bright and the remainder filtered with comparative ease. The addition of a little ammonia is said to help to clear the turbidity and assist in the preservation of the liquid as well.

Instances also occur amongst the tinctures; those of calumba and cardamoms should always be allowed to stand for about a week after being pressed off, otherwise filtration will be very difficult; tincture of squills I have already alluded to.

We next come to the consideration of funnels and filtering apparatus. I do not intend to say much about the former, as the question of the right shape has been pretty well argued out already.

As to the kind of funnel: up to the quart size I think glass ribbed ones answer best; whilst from two pints to five pints porcelain is the most convenient, the only objection to it being the expense and the ease with which it is broken, but to compensate for this it is easily cleaned, and not acted upon by acids or alkalies, whilst of the other kinds, in using a tin funnel there are so many cases in which a liquid may be spoilt by it, that for all round purposes its use is not possible. This applies also to the enamel funnels, as the enamel soon wears off, and then you are in as bad a case as with a tin one. Larger funnels than those of five pint capacity do not as a rule answer, indeed, it will be found that a number of small funnels give infinitely better results than one large one.

There are one or two things that it is well to remember in connection with funnels. After fitting the paper into the funnel moisten with a little water, preferably hot. This promotes active filtration and washes the filter besides. If the liquid to be filtered be very hot, or dense, or contain a free acid, or alkali, use a double filter, but be careful to fold the papers separately, and place in the funnel so as to have the double portion of the papers opposite to one another and not both on the same side, as you would have if the two papers were folded at the same time. Pour the liquid gradually on the side of the filter and not on the apex—the weakest part. See that the filter paper fits the funnel exactly; it is merely waste of liquid to project at the top; and, lastly, in filtering into a bottle the end of the funnel should project below the lowest part of the neck of the bottle, otherwise the liquid will run out instead of in. In continuous filtration for small quantities it is only necessary to invert the bottle containing the liquid to be filtered, supporting it upon a retort stand with its mouth in the liquid at the level at which it is desired to keep the funnel filled. The liquid in the filter acts as a valve, preventing ingress of air, without which the flow of the liquid from the bottle to the filter cannot take place.

For larger quantities various forms of apparatus have been devised which I do not propose to go into, neither do I intend to dwell on the varieties of filtering apparatus which have been invented. I have chosen three only as being the ones best known and likely to give the best results; they are Schacht's, Squire's and Bird's, of which you have roughly executed diagrams before you. However, before alluding to these I should like to say a word as to hot filtration. This method is the one resorted to in the case of yellow wax ointments, benzoated lard, etc., besides being indispensable in dealing with preparations containing gelatine, such as glycerine jelly.

The apparatus used on a small scale usually consists of a double funnel with an intermediate space containing hot water or steam and a projecting tube near the bottom for keeping up the heat of the water by the flame of a lamp.

Sometimes a box of tin plate or copper is used containing water kept at the required temperature. There are conical spaces let in for the reception of funnels. Hot filtration is very useful for oils, but it must be remembered that it is not applicable to syrups and syrupy liquids. Indeed, it would be found that the liquid would filter just as quickly if it were cold, besides the danger of causing fermentation.

Pressure filtration. The action in this case depends upon the principle that a column of water descending through a tube from a height is capable of sucking with it the air contained in a lateral tube if the latter be properly arranged. This lateral tube is connected with the receiving vessel of the filtering apparatus, and thus a vacuum is produced, the rate of filtration being thereby quickened.

The ordinary india rubber tubing will not answer for this purpose, a special kind having an inner lining of canvass to ensure great strength will have to be used. Pressure filtration is not of much practical value in a pharmaceutical laboratory, being more adapted for analytical use, for it requires a lot of patience in the fitting up, as great care has to be taken that all the joints are tight, or the great pressure exerted by the water will soon play havoc with the apparatus, and, besides, there is the very important question of the cost of water to consider.

When it is used it is most applicable to those liquids which being thick and muddy will not pass through an ordinary filter at all. But we must not lose sight of the fact that owing to the vacuum produced substances which the filtering medium would have retained under ordinary circumstances, are by this means carried through, and thus perfect filtration is not ensured. As a rule it will be found that the perfectness of filtration is inversely proportional to rate at which it progresses.

In setting up a pressure filter a good deal of trouble is often experienced with the paper, which has an unhappy tendency to burst. This may be avoided either by treating the paper with diluted sulphuric acid (one part of water to two of acid), when it is converted into parchment paper, which under ordinary circumstances is almost impervious to liquids, but with a pressure filter gives very good results, or by dipping the apex of the paper in 1·42 nitric acid, washing and drying, or by inserting a cone of platinum or zinc beneath it.

Filter paper treated as described with nitric acid will answer very well in most cases in which a merely toughened filter is required, but of course the parchment paper prepared with sulphuric acid will only do for a pressure filter. The last kind of filters are those which work on the principle of upward filtration. All of these depend upon the syphon for their working, advantage being taken of the pressure of the atmosphere by using a long column of liquid to suck the filtrate through. (Diagrams of Schacht's, Symes', and Bird's filters were shown and described.)

Now of these three filters I think that preference should be given to Bird's, for three reasons:—that the size of the containing vessel can be varied easily,

irrespective of the size of the filter, so that 10 gallons can be filtered with the same filter as 10 pints. Besides this, if the liquid contains a suspended precipitate, it will have a chance to settle, and thus allow the clear liquid to be easily filtered off before the muddy portion is reached. I have found Bird's filter answer very well for large quantities of such things as soap liniment and infusion of quassia, which filter readily by ordinary means, but by using this apparatus require no looking after. The filter can be set going at night, and on coming back in the morning it will be found all filtered, but it is not applicable to liquids with a tendency to clog, such as concentrated infusion of gentian, and of course for small quantities it is not worth while setting up the filter if the liquid filters pretty readily by the recognized means.

Hints to Students.

BY LEWIS MACLEOD.

Mr. Chairman and Gentlemen,—As you are aware, the paper which I intend to read before you to-night is entitled "Hints to Students." I do not think I require a very great knowledge of human nature to convince me that I am addressing some to-night who are ambitious of possessing the Minor certificate of the Pharmaceutical Society, but who are also somewhat discouraged by the difficulties of winning that coveted piece of paper. Perhaps a few suggestions from one who recently has run the "blockade" of the six rooms may prove helpful to some who have just begun to burn the midnight oil of lamp and brain. The title of my paper may suggest slightly that I am going to do what I can to instruct intending candidates in the game of "dodging" their examiners when the eventful day arrives. I trust to be able to prove before I have done that such is not my intention.

I have embodied my suggestions in the shape of four maxims. These I have tested and tried, and proved their worth. The first is, "be enthusiastic;" the second, "be observant;" the third, "be critical;" the fourth, "be practical."

Be enthusiastic. "Nothing great was ever done without enthusiasm," says one writer, and he spake wisely and well. We have much to be enthusiastic about. The profession of chemistry and pharmacy is a great and important one, and we are proud of it. It affords scope for the keenest intellect that can be brought to bear upon it. Its toils and difficulties are many, but its triumphs are great.

Students are, as a rule, somewhat slow in settling down to work for the Minor examination. The result of this is that they brood over and magnify real difficulties and invest unreal ones with all the appearance of reality, besides lessening that which is of inestimable value to them, namely, self-reliance.

If you start your studies with some conception of their real dignity, I really do not see how they can prove otherwise than fascinating to you. But on the other hand, if you cram your work and pursue it as something which you are loth to begin and glad to leave off, it cannot fail to prove quite as disgusting. This is quite natural. Your intellect is too grand and sublime a structure to acquiesce in such a method of working. It is not what we eat but what we assimilate that sustains our bodies; it is not what we read but what we understand that constitutes real practical knowledge. It is no delight to your examiner to hear you run off a difficult equation most glibly and correctly from memory; but he does expect, and very reasonably, that you should exhibit a sound grip of the principles concerning the construction of such an equation.

I scarcely need, I think, to ask you to be enthusiastic over chemistry. It has a fascination all its own. If you are not greatly enamoured of botany, start to collect a herbarium, and I venture to predict that ere long a "primrose by the river's brim" will be something more than simply a "yellow primrose" to you. If materia medica has no charms for you begin to construct a cabinet all your own, and very soon you will come to regard your specimens with quite an affectionate interest, and be eager to find out all you can about them. Then there is the B.P. But I fancy I hear some one call a halt at the mention of this much-talked-of volume, and solemnly avow that he can see no beauty in it. Yet I can assure you, gentlemen, that I found few books so interesting as the B.P. "And what made it so attractive?" you ask. I answer "Its difficulties." If you are a seeker after truth you will constantly be asking the question "Why is this so?" To some such queries, research will furnish a more or less speedy answer; to others no reply will come; but to the earnest and intelligent mind the study of these problems will afford keen delight. Let me then repeat and emphasize my first maxim—"be enthusiastic."

My second maxim is—"be observant." Take note of small things. This habit is of inestimable value. It will render you yeoman service, not only at Bloomsbury or Edinburgh, but also in your continued quest after truth. You will find it especially useful in studying practical chemistry. Familiarize yourself with the various chemicals which daily pass through your hands. At the Minor I identified all my salts and metals right away, simply through having pursued this policy. Your examiners are gentlemen, but they are human, and men of like passions with yourselves. If they see you plunging wildly over a simple crystal of borax or alum or oxalic acid, and as a last resource take it through the chart, that sheet anchor of the despairing candidate, they cannot help coming to the conclusion that you have neglected to lay the very foundation stone of your pharmaceutical training, namely, observation.

A word as to the examiners. Some students appear to regard them as their natural enemies, and you will hear them described as a body of men who are cruelly expert in trapping unwary candidates in much the same way as the cunning and relentless spider entangles the unfortunate fly in his web. I ask you to reject this view as wholly unjust and erroneous. It generally emanates from the prejudiced imagination of some unlucky student, who has made a serious blunder, and has been "plucked" in consequence. If the candidate has "crammed," and has therefore only a superficial knowledge of his subjects, he will occasionally catch a "tartar" in his examiner, and deservedly so; but if he exhibits a sound grip of his work, no one is more ready and pleased to acknowledge it than his examiner. Let me pay a tribute to the Edinburgh examiners. I will do it in their own native Doric, by assuring you, that if you should present yourselves for the Minor at the Scottish capital, your examiners will be happy to do everything consistent with their responsible position to "mak' ye feel at hame."

In my third maxim, I ask you to be critical. Do not mistake me on this point. It is very fashionable with some people to make a great fuss over errors of microscopical dimensions, simply because they wish to say something. This is not true criticism, this is conceit, and conceit is the offspring of ignorance. True criticism is the simple and reasonable demand of the mind that assertions or deeds should stand the search light of properly conducted investigation.

Prove all things. Do not rush to conclusions. This hint applies especially to practical chemistry. Be calm, be observant, be critical. If you get a strong yellow flame coloration from your chemical do not lose your head with delight over the simple sodium salt you think you have got, for something else may be blending its weaker colour there. If your salt on heating gives off the grateful odour of burnt sugar,

and that soft beautiful violet colour so refreshing to the eye of the student, forbear your ecstacy, be critical, be suspiciously so; a powerful drug may be lurking there and you may miss it, and woe betide your marks if you do. I think I have said enough to convince you that a true critical spirit is a qualification of great importance to the pharmaceutical student.

In my fourth maxim I ask you to be practical. This applies to all your subjects of study, but very specially to botany and dispensing. You cannot learn botany from books alone. The student may, and sometimes does cram the definitions and descriptions to save the bother of carefully examining the plants, but the knowledge thus acquired will be as short-lived as the bloom of the immortal poppies of Robert Burns. Your energetic teacher will be able, I have no doubt, to supply you with the striking verse to which I have alluded.

When I come to dispensing I believe I touch a sore point with many students. If a candidate is weak in this most essential subject it tells heavily against him, and very reasonably so. Proficiency is imperiously demanded in the preparation of mixtures, pills, emulsions, suppositories, plasters, etc., and how is it to be got? Let me venture a plea for such students. I would appeal to their employers to try and smooth their thorny path somewhat. A little spare time comes occasionally to every student if he puts method into his duties. Would it not be a boon if in these short intervals the student, with the 'Art of Dispensing' at his elbow, were permitted to operate with small quantities of drugs, and so gradually acquire skill and confidence in this most important branch of his education. I venture to say that the gain would not be altogether on the side of the student, but that the employer would very soon discover that his generosity had secured to him an earnest and trustworthy worker, one who would be able to tackle an obstinate set of pills or a tricky mixture whenever it came. If you cannot spread a plaster with facility do not lose sight of the matter. "Ah! but there is where the difficulty lies," I hear someone exclaim. "I might destroy sheepskin after sheepskin ere I could turn off a passable article." Do as I have done; spread the plaster on thick paper. After I had critically surveyed my work and praised or condemned it, I scraped off the plaster and made it serve for another attempt. The thing worked beautifully and there was no waste.

A hint in regard to prescription reading, and then I have done. Do not be content with merely copying a prescription in its usually abbreviated form. You may enter it so, but make a practice of mentally declining your Latin in full; and if you have not got an abundance of prescriptions to copy, a good deal of Latin and pharmacy also appeal to you right eloquently as you dust the bottles on the shelves in the morning.

And now, gentlemen, I thank you for listening so attentively to this paper. I have tried to follow these four maxims myself. I now recommend them to you, and simply ask you to take them for what they are worth.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of this Association was held at 103, Great Russell Street, on Thursday, March 21, Mr. E. J. Millard, President, in the chair.

The minutes of the previous meeting having been read and confirmed, and a new member proposed, the President called on Messrs. Richards and Rogers to read a paper entitled, "The Microscope in its Application to Pharmacy," by G. Richards, F.I.C., and F. Ashley Rogers.

The paper will be published in a future number.

Parliamentary and Law Proceedings.

Poisoning by Chloral—A Question of Labelling.

On Friday, the 22nd inst., an inquest was held at the Police Station, Torquay, touching the death of Thomas Tomkins, aged 58, a retired auctioneer, who had been found dead in his bed on the previous Wednesday.

William John Rawling, assistant in the branch establishment of Mr. Bathe, chemist, of Abbey Road, situate in Lower Union Street, said he knew deceased by sight but not by name. He passed the shop frequently, and usually spoke. Deceased first came to him on Monday afternoon for medicine. He asked for chloral to induce him to sleep, saying he was greatly troubled with rheumatics. He said a friend of his in London had advised him to take chloral. Witness told him it was dangerous to get into the habit of using such medicine, but he persisted in being served with it. Witness prepared a mixture with water, containing 1 ounce syrup chloral. This was placed in a graduated bottle, and labelled "An eighth part for a dose at bedtime," giving instructions not to take it unless absolutely necessary.

The Coroner produced the bottle and asked witness how it was that it was not labelled "Poison."

Witness said the Act of Parliament did not require it when the medicine was put up in the form of that supplied to the deceased.

The Coroner said the Pharmacy Act required that all medicines containing poison should be labelled as such.

Witness said the Act laid down that poisons could only be supplied to persons on certain conditions, but did not apply to a medicine made up with poison in it.

The Coroner said all physic containing poison must be so labelled. The Act was passed to safeguard the public, who did not know what was or was not dangerous.

Witness said if this was the case he misunderstood the Act. He qualified in 1883.

Mr. F. E. Cave, house surgeon at the Torbay Hospital, said he was called to the house of Mrs. Warne on Wednesday evening, and found him dead in bed. He subsequently made an examination, and found that there was extensive disease of the heart and lungs. The other organs were all healthy. There was a certain amount of fluid in the stomach, but there was no chloral in it, as it had probably passed into the blood. He was of opinion that deceased had been dead for 12 or 16 hours. He believed death was caused indirectly by the chloral, the narcotic having affected the heart and lungs.

In reply to the Coroner, witness said 70 grains of chloral would not kill a man in perfect health, but would have a fatal result in the case of a man suffering from heart and lung disease.

The Coroner, in summing up, said the question to be decided by the jury was whether the deceased met his death from an overdose of chloral, or whether he committed suicide. The medical evidence went to show that 70 grains of chloral would kill a man in a weak state like the deceased, but on the other hand some letters that had been produced pointed to suicide.

The jury returned a verdict that deceased committed suicide whilst in a state of temporary insanity, adding a rider to the effect that in their opinion the law had been violated in that the label "poison" was not affixed to the bottle.

The Coroner said no doubt the police would take notice of the rider, and if they thought it necessary to take steps in the matter it would be for them to do so; although the label would not have made any difference in case of suicide, it was the duty of chemists to take every precaution for the public safety.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

What is the Use of the Pharmaceutical Society?

Sir,—The above question was asked at the meeting of druggists called to consider the medicine stamp prosecutions. "Why don't the Council protect chemists against these petty prosecutions?" Under the conviction that no good would come of debating these points, I expressed my conviction that the Council would not take up the matter as it was then before us. As Chairman of the meeting, and as an old pharmaceutical councillor, my dictum was accepted. I find Mr. R. H. Davies, in his letter, March 23, asks, "Why such a conclusion?" And I feel that it would not be unreasonable that many others should ask the same.

At the meeting the problems before us were of too mixed a character to expect the Pharmaceutical Council to take them up. When we have sifted the matter and taken such action as individuals or local committees might be expected to undertake, and conclude to appeal to the Pharmaceutical Council, I think we could do so with a right to demand their services in promoting any course which we could indicate as being advantageous to the trade, whether that action should be of the nature of an inquiry, a protest or an appeal to Parliament.

With the best of intentions the compulsory examinations and curriculum will bring into the trade a multitude of incompetent men with the stamp of qualification upon them.

The so-called student who, after attending satisfactory courses of lectures on materia medica and botany, informed my scientific neighbour that spermaceti was a product of the cetaceum tree, belonging to the natural order Menispermaceæ, demonstrated how little good may be derived from a compulsory curriculum.

As regards public safety and advantage, it is more important that the pharmacist should be able to give reasonable and useful information upon his labels than that he should have passed an examination on the cetaceum tree.

Remembering how little interest there was in the Benevolent Fund before it was applied actively to the relief of the aged and infirm, one feels encouraged to hope for good results and popularity accruing to the Society from any symptom of vigorous vitality, be it in scientific research or pharmaceutical legislation, provided the expenditure of energy does not involve the want of action in those directions which are of most importance to the greatest number.

It seems to me a disgrace upon the Pharmaceutical Council that when the question of liability to duty of Blaud's pills was being debated, the burden of the battle should fall upon an individual chemist in the first place, and that the obtaining of counsels' opinion, which reversed the decision of the Board of Inland Revenue, was obtained through the proprietors of the *Chemist and Druggist*, instead of through the legally constituted organization for the protection of those who carry on the business of chemist and druggist.

If as the result of the working of the trade committee in Newcastle we are fortunate enough to present to the Council a clear point for their attention, it would be their duty to give every assistance, and it would be a fatal blow to the prosperity of the Society should they neglect it.

Newcastle. Barnard S. Proctor.

[*** We are not aware that the decision of the Board of Inland Revenue as to the sale of Blaud's Pills has been reversed, as Mr. Proctor states, and can only suppose that he is under a misconception in regard to that point, as he certainly is in his assumption that no action was taken on the part of the Council in effecting a settlement of the question in dispute between the Board of Inland Revenue and the Edinburgh chemist. The fact is that the settlement was brought about mainly by such interposition.—Ed. Pharm. Journ.]

Chlorodyne and Syrupus Ferri et Quininæ Hydrobromatum, B.P.C.

Sir,—On referring to one or two recent numbers of your Journal, I find in regard to chlorodyne Mr. F. H. Prosser, in a paper read before the Midland Counties' Chemists' Association (*Pharm. Journ.*, Feb. 23, 1889, p. 677), states that Tinct. Chloroformi et Morphinæ "is called by the 'Extra Pharmacopœia' the equivalent of chlorodyne." I beg to point out that there has never been such a statement in any edition of the 'Extra Pharmacopœia.' On the contrary, in criticising the B.P. preparation, I stated (*Pharm. Journ.*, Nov. 28, 1885, p. 453) that "Tincture of chloroform and morphine is practically Mr. Squire's formula, with four times the quantity of morphine, but it is still deficient in this essential ingredient; administered as a hypnotic, for which purpose the original preparation is often given, the maximum dose, 10 minims, containing one-forty-eighth grain of hydrochlorate of morphine, will only lead to disappointment."

I notice that Mr. R. A. Cripps (*Pharm. Journ.*, Jan. 26, 1889, p. 586) says that the quinine salt crystallizes out of solution in syrupus ferri et quininæ hydrobromatum, B.P.C., and suggests a reduction in the quantity of quinine used. Quinine salts, as you are aware, are somewhat variable, but by using the acid hydrobromate in making this preparation, I have not noticed any such crystallization occur. Have any other observers done so?

10, *New Cavendish Street, W.* Wm. Martindale.

Medicated Wines.

Sir,—Glancing over your article on the difficulties which beset chemists in the pursuance of their business in supplying "medicated wines" that are not in the Pharmacopœia, just as many patent remedies in daily use are not included in that compilation, it has occurred to me that the Chancellor of the Exchequer might very properly be approached with the view of allowing a modified licence, say after the pattern of the methylated spirit licence, to enable registered chemists to supply medicated wines, strictly so-called, in the course of their business.

This could not interfere with the general wine trade.

The consumption of these commodities being very restricted, it might in the great majority of cases prove unremunerative even to pay so small an impost. Still, respectable men would rather submit to it than run the risk, alarm, odium of even the appearance of breaking the law, or the harassment of requiring to defend themselves in Court.

Most applications to the Chancellor have for their object the removal of burdens that may be considered oppressive. In this case it is reasonable that he would only be too happy to receive a suggestion that might add a drop or two to the bucket of our heavy taxation without encroaching on other interests.

Now is the time to take action to be of any avail. *Verb. sap.* A. B. G.

Origin of the British Flora.

Sir,—In Mr. W. A. Salter's paper on the "Origin and Distribution of the British Flora," read at the Chemists' Assistants' Association, part of which appears in your issue of March 23, he (Mr. Salter) says, "a considerable difference of opinion exists as to the derivation of the Spanish plants." Now without going back so far as the pre-glacial period, I think a reason for the presence of the Spanish plants in Ireland may be attributed to the fleet of the Armada, many of the ships belonging to which were wrecked on the coast of Ireland, and as the Spanish galleons probably carried large quantities of grain the species mentioned may have been amongst it. Very likely many of these vessels had visited the New World, and this may also account for the presence of the North American plants *Spiranthes Romazoviana* and *Sisyrinchium angustifolium*. C. J. S.

"*Thurso.*"—(1) *Carex vesicaria.* (2) *Luzula campestris.* (3) *Luzula multiflora.*

G. Bowie.—Your note has been handed to the Secretary, to whom all communications as to the transmission of the Journal should be sent.

Communications, Letters, etc., have been received from Messrs. Johnston, Ince, Wright, Humphrey, Thompson, Shenstone, Interested Party.

SAFFRON AND ITS SOPHISTICATIONS.

BY BARNARD S. PROCTOR.

Among the many articles written upon this subject, I do not remember to have seen any upon the determination of the value of saffron by the estimation of its tinctorial power. Yet this being the power for which it is most valued, no other test seems so appropriate as an indication of its worth. Some months ago, when wishing to ascertain the relative merits of Valencia and Alicante saffron, I adopted a colorimetric estimation, with the result that the tinctorial powers were just about proportionate to the commercial prices of the samples. Thus the problem of the moment was satisfactorily disposed of, and the result suggested the desirability of this mode of examination being worked out in such a way as to be readily available for general use.

The first problem was to fix upon a standard for the comparison. Nothing could be more desirable for this purpose than an authentic sample of good saffron with which to compare others, but there would naturally be some difficulty in saying which sample should be accepted as a good standard, and I concluded to adopt bichromate of potassium as a standard which every one can readily procure of unquestionably uniform tinctorial power, and though the tone of the colour of its solution is not exactly the same as that of an infusion of saffron, it is so nearly the same as to allow of its use without difficulty.

The next point was how to insure the effective exhaustion of the sample.

The colour produced by macerating a grain of saffron in a drachm of rectified spirit looks so much paler than an aqueous infusion made in the same way as to give the impression that water is the best solvent; but if these are both diluted with a pint of water the alcoholic extraction is found to be most highly coloured. Hence the necessity for having regard to the degree of dilution ; and if the sample be boiled with successive drachms of spirit till exhausted, and another equal sample be treated in the same way with water till exhausted, and the products in each case be diluted to a pint with water, the colours are found to be equal. Though the spirit extracts the colour more rapidly than water, I have found the alternate action of spirit and water sooner completes the exhaustion than either solvent used singly.

A grain of saffron is a convenient quantity to work upon. This being placed in a phial with f℥ij. of ether, should yield to the ether a yellow colour of no great intensity, otherwise the presence of some of the aniline dyes may be suspected. The ether being decanted and the phial warmed till the saffron is again dry, f℥ij. of spirit, rectified or methylated, is poured on the sample, and heat, short of ebulition, is then applied for an hour or so ; the tincture is then decanted into a 2-ounce phial. The saffron is next treated with f℥ij. of water and heated as before, the infusion being added to the previous liquor, and the extraction is continued with alternate portions of spirit and water till the solvents cease to extract colour and the fibres are nearly white. Three portions each of spirit and water usually effect a satisfactory exhaustion. The total liquors being made up to exactly 2 fluid ounces should have an orange colour closely resembling a solution of 14 grains of bichromate of potassium in 2 ounces of water, but the true value of the colour cannot be judged without both liquors are diluted with a large bulk of water. After sundry methods of comparing the tints had been tried, I concluded that the best results were obtained by taking 8 minims of the standard liquor and diluting it with an ounce of water, half filling a test-tube of about ½ an inch in diameter with this diluted standard, then adding to an ounce of water 8 minims of the liquor obtained from the sample under examination, and having half filled a similar test-tube with this, holding the two tubes side by side against a sheet of white paper, standing with back to the window and a good diffused daylight falling upon the samples. If the standard be found appreciably the darker of the two the value of the sample under examination may be estimated by the number of minims of its liquor, which it is necessary to add to the ounce of water to make the tints equal.

Operating in this way upon four samples of adulterated saffron supplied to me by Mr. E. M. Holmes, and marked:—1, marigold saffron ; 2, marigold saffron; 3, saline saffron, and 4, loaded saffron, the saline saffron being the sample upon which he published a note in the *Pharmaceutical Journal* of February 23, 1889, I found the value of—

No. 1 to be ⅖ pure saffron, 20 minims of the liquor being equal to 8 minims of the standard, presumably 60 per cent. adulteration.

No. 2 gave 11½ minims=8 of standard, and by proportion 11½ : 8 : : 100 : 69 there was 69 per cent. of saffron and 31 per cent. of adulteration.

No. 3. 19 minims equalled 8 minims of standard, and by the above calculation there would be 44 per cent. of saffron and 66 per cent. of adulteration.

No. 4. 25 minims equalled 8 minims of standard, and by calculation there would be 32 per cent. of saffron and 68 per cent. of adulterant.

Repeated trials gave results which were more or less closely concordant. For example, in another operation upon No. 1 I obtained the number 22, instead of 20, as the equivalent of 8 minims, and in a repetition of No. 3 I stopped short at 18 minims as being closely approaching the equality of tint, and then adding more the number was increased to 21 before I could certainly say the tint was darker than the standard, thus sufficiently confirming the number 19 at first fixed upon as the point of equality.

A circular recently issued by a saffron merchant points to the following as the principal adulterants of this drug:—Glycerine, glucose, vegetable filaments dyed red, honey and emery powder, honey and sulphate of baryta, and sulphate of soda; but does not notice the point, which is of some importance in Mr. Holmes' paper, that organic and ammoniacal salts are also being used. Glycerine and glucose would be noticeable by the moistness and stickiness which their presence in any considerable proportion would impart. Foreign filaments would be noticeable after the swelling of the saffron by infusing in water. The latter three adulterants would be readily indicated by the greatly increased ash, but an impregnation with nitrate or oxalate of ammonium might escape all these examinations, but would scarcely escape detection if the above colorometric test were applied. And the colour test has the advantage of meeting at one operation all

classes of adulterants except those which have equal colouring powers. To accomplish this it is worth while taking some pains to secure a complete extraction of the colouring matter, and to make a careful comparison of the shades of colour in the dilute liquors. Those who use chromometers or tintometers for the purposes of the dyer or brewer acquire great skill in discriminating slight differences in the shades of highly dilute colour solutions, but even an uneducated eye can detect such differences as would result from the adulteration of saffron to such an extent as would permit of its being sold much below the market value of the pure.

Adulterations which include the addition of cheaper colouring matters still require to be kept in mind. Mr. Holmes has drawn attention to the dye known as saffron surrogate, as being one which imparts its colour freely to ether, the colouring matter of saffron itself being only sparingly and slowly dissolved by ether. I have but little acquaintance with yellow dyes, but have experimented upon four which I had at hand, Ekins' tropœolin, methyl orange, picric acid and Bismarck brown. The two former develope a strong red colour with hydrochloric acid, which has no marked action upon saffron. Picric acid would be detected at once by its intense bitterness, and Bismarck brown, which has a nearly pure yellow tint, when in very dilute solution, retains sufficient of the brown or buff tint to be discriminated by a critical eye, and though the action of acids and alkalies are as inconspicuous as they are upon saffron, and the action of chlorine bleaches both, iodine affords a discriminating test. If solution of Bismarck brown, and infusion of saffron of such a strength as to have a good yellow colour, be each treated with B.P. tincture of iodine, 2 or 3 drops to the ounce of solution, the saffron liquor is scarcely changed, while the Bismarck brown liquor changes from its yellow tint to a deep brown with a turbid appearance, though there is no immediate precipitate.

HOW TO TAKE PHOTOMICROGRAPHS.

BY J. C. SHENSTONE, F.R.M.S.

Noticing in the discussions upon two papers recently read before the Chemists' Assistants' Association an interest was evinced in photomicrography, I thought a short description of a simple and inexpensive apparatus, which in my hands has answered every purpose for some years past, might not be out of place in the columns of the journal.

I may state that the apparatus was devised by myself, and although I believe all new apparatus are recorded in the *Journal of the Royal Microscopical Society*, I know of none so inexpensive, and at the same time so useful, as this has proved itself.

The following diagram illustrating my apparatus is almost self-explaining.

A is the camera; any fairly good quarter- or half-plate camera will answer the purpose.

B is a zinc tube, diameter about 2 or 2½ inches, length 8 or 10 inches. It is fixed by a flange at one end, to a board made to fit the front of the camera, in the same way that the board which ordinarily carries the lens is fixed to it.

C is a second zinc tube of about the same length as the tube B, and telescoping into it. The joint must be made light-tight by lining the end of tube B with velvet. The tube C should have a narrow flange at one end. These tubes can be made by any coppersmith.

D is a bag made of at least two thicknesses of velvet. It is fixed light-tight, over the flange of tube C by means of tape or elastic. It is also fixed light-tight to the tube of the microscope in the same manner.

E is the microscope. Any monocular instrument will do. It is best used without an eye-piece. The better the objective used, the better of course will be the photograph.

The *modus operandi* is simple. The object is placed upon the stage in its usual position; when lighted and focussed the enlarged picture will be thrown upon the screen of the camera.

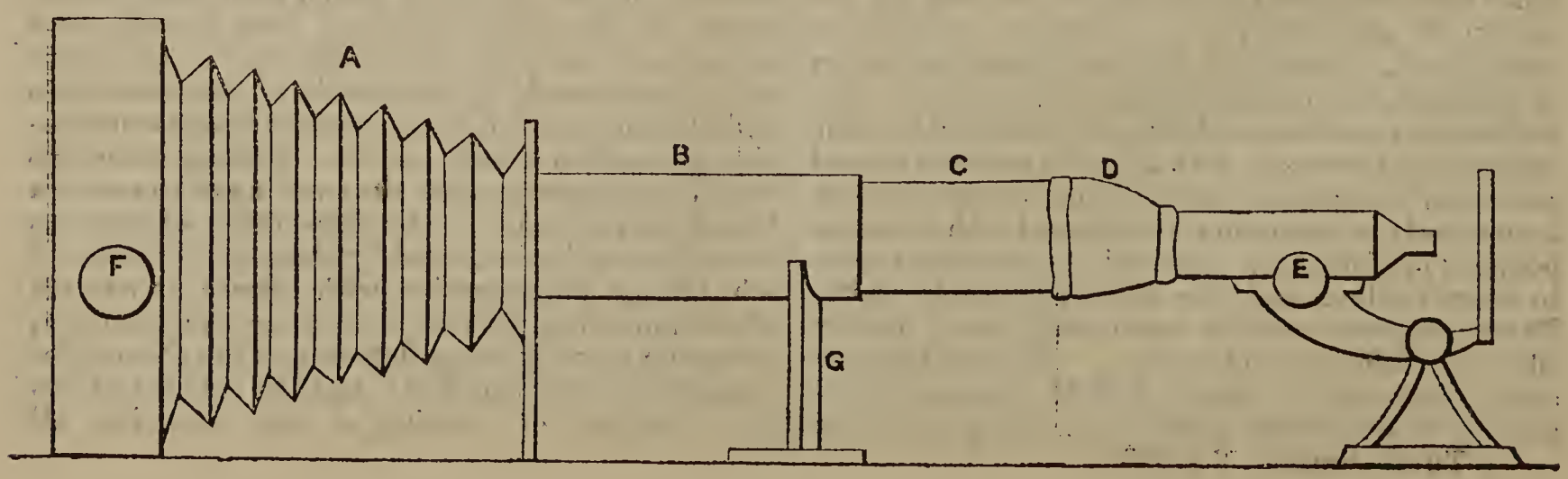
The adjustment can be made—

1. By the rack and pinion of the camera.
2. By telescoping the tube C into the tube B.
3. By pushing the microscope further into C.

In this manner an enlarged picture of almost any size can be obtained, for the greater the distance between the objective and the screen, the larger will be the picture. If it is desired to produce a series of photos to the same scale, this can be done by using the same objective at the same distance from the screen in each case.

If one of the objects has been measured and its diameter compared with the diameter of its photograph, the amplification in each case will be the same if the above conditions are adhered to, and it will be unnecessary to repeat the measurement in each instance.

The fine adjustment can be made by the focussing arrangement of the microscope E, but when photographing *to scale* it would be necessary to make



the *tube of the microscope* rigid by fixing it to a support similar to that marked G, so that in focussing, the objective remains immovable, whilst the stage is free to move in either direction.

A slight inconvenience may at first be felt in reaching to E in focussing; after a little practice this gives no great trouble, and might be entirely obviated by connecting E with a groved wheel F by means of a band, in which case it would be necessary to make both the microscope and the camera rigid.

A strong light is necessary for lighting the object. I have found a good size Hink's duplex lamp answer every purpose. In lighting a transparent object I direct the light through the object by means of a bull's eye or a Kelner eye-piece. In lighting an opaque object I direct the light into the object in the same way. For special work a more refined method of lighting might be required, but this plan will be found to answer most purposes.

I do not think it necessary to give details of photographic and microscopic manipulation, as they differ in no respect from those in ordinary photographic and microscopic work.

The cost of adapting an ordinary camera and microscope for this work should not exceed half-a-crown, whilst a quarter-plate camera suitable for the purpose (which would also be useful for general photographic work) can be purchased for a guinea or upwards.

NOTES ON ESSENTIAL OILS FROM MESSRS. SCHIMMEL AND CO.'S REPORT.

The following notes on various essential oils are taken from the April *Bericht* of Messrs. Schimmel and Co., of Dresden:—

Angelica Oil.—The results obtained from the parcel of angelica root imported from Japan, to which reference was made in the previous report (see before, p. 326), differ essentially from those experienced with the German drug. The Japanese roots have the same tufted-form as the German, but are lighter and nearly white and are provided with stronger rootlets. They are referred to one of two species, *Angelica refracta*, Fr. Schmidt (Jap. "*Senkiyu*"), or *A. anomala*, Lall. (Jap. "*Biyakushi*"), both of which, according to Rein, are cultivated in the open fields in Japan. This Japan angelica root proved to be comparatively very poor in essential oil, the yield being only one-tenth per cent., the oil also being essentially different from commercial angelica oil. Whilst the German distillate has a specific gravity of 0·853 at 20° C. that of the Japanese is 0·912 at the same temperature. At 10° it gives a separation of crystals and at 0° it solidifies to a paste. The crystalline mass obtained by cooling and draining had the properties of a fatty acid melting at 62°–63° C. The oil boils between 170° and 310° C., the last portion that passes over having a beautiful blue-green colour. The residue solidifies upon cooling and consists principally of the non-volatile fatty acid. The odour of the oil is unusually intense and persistent, more acrid than that of the German angelica oil, but possessing the characteristic suggestion of musk. The cost of this oil deprives it of any industrial importance.

Anise Oil.—The statement made on "high authority" in the paper read at a recent evening meeting of the Pharmaceutical Society by Mr. J. C. Umney, to the effect that for every pound of aniseed oil from *Pimpinella Anisum* a thousand pounds of star-anise oil are met with, and the subsequent statement of Mr. John Moss that he would put the proportion as one to ten thousand, are sharply criticized as underestimating the importance of the aniseed oil industry. Messrs. Schimmel say that in their factory alone under ordinary circumstances 7000 kilos of aniseed are worked up daily, yielding 200 kilos of aniseed oil. They place the annual production of oil from seeds of *Pimpinella Anisum* at 42,000 kilos, or equal to about 1400 canisters of star-anise oil, and they raise the question whether the annual production of star-anise oil amounts to 1400 canisters, to say nothing of one thousand or ten thousand times that quantity. Messrs. Schimmel make this correction in the hope that in future such questions may be discussed "with more care and upon a better basis, bearing in mind that the centre of gravity of the manufacture of essential oils lies in Germany, and not in England."

Bay Oil (*Myrcia acris*).—Under this heading the following two recipes for the preparation of "bay rum" are given:—

I.

Bay Oil	2 drachms.
Pimento Oil	1 drachm.
Cloves Oil	10 drops.
Alcohol (95 per cent.)	½ gallon.
Water	½ gallon.

Mix and allow to stand for several days, then filter.

II.

Bay oil	1 ounce.
Alcohol (95 per cent.)	½ gallon.

Mix and allow to stand for a fortnight. Then add one gallon of good Jamaica rum. The bay rum made according to this recipe is said to correspond with the imported article.

Betel Oil.—A statement made in a previous report to the effect that the essential oil of betel leaves contained eugenol was considered to be opposed to a report by Professor Eykman upon the composition of a sample of betel oil examined by him; a fresh investigation has therefore been made with the following result. The sample of betel oil examined was a slightly brown coloured liquid, sp. gr. 1·024 at 15° C. It consisted up to about two-thirds or three-fourths of a phenol, the boiling-point of which in partial vacuum, under a pressure of 12 mm., lay at 131–132° C.; under ordinary atmospheric pressure it underwent decomposition on boiling. The specific gravity of the phenol was 1·067 at 15° C. Examination of the oxidation products, acetyl compound and methyl ether showed that this compound was not eugenol, but an isomer, the composition of the new compound and of eugenol being represented as follows:—

New Compound.	Eugenol.
C_6H_3 [1]C_3H_5 [3]OH [4]OCH_3.	C_6H_3 [1]C_3H_5 [3]OCH_3 [4]OH.

The second constituent of betel oil boiled practically between 250° and 275° C., had a very agreeable tea-like odour, and consisted for the greater part of a sesquiterpene ($C_{15}H_{24}$), cubebene, which is characterized by its dihydrochlorate melting at 117–118° C. This composition differs considerably from that given by Professor Eykman, but how far the difference may depend upon the oil examined by Professor Eykman having been distilled from fresh leaves, whilst that examined by Messrs. Schimmel was distilled from dried leaves, has not been determined.

Bergamot Oil.—Some question having been raised recently as to the natural colour of bergamot oil, Messrs. Schimmel publish some information on the subject obtained from two of the largest producers in Reggio. One of them says:- "This essence occurs for the most part of a brown-yellow colour. A certain quantity approximates more to green, but

this is an essence prepared only from unripe fruit. In commerce it seldom occurs pure, since it is ordinarily mixed with the essence prepared later from ripe fruit. Carefully examined in a glass tube it cannot properly be called 'green,' but there is always a yellow colour perceptible. The emerald green essences which have been exported from Messina are such as have been allowed to stand for a long time in badly tinned vessels, and the colour is due to oxide of copper." The second correspondent says:—"After the working of the bergamot fruit the essence obtained is honey coloured, and it is usually put forward and sought for of this colour. The green colour is acquired when the oil is allowed to stand a certain time—about seven or eight months—in the vessels; it attacks the tinning and becomes green through contact with the copper. This is the correct explanation of the two colours; any other is false."

Cajeput Oil.—Referring to a large consignment from Macassar, Messrs. Schimmel state that according to their experience cajeput oil directly imported is always genuine and trustworthy, but that in intervening commerce, and, as they hear, especially in America, it gets adulterated with camphor oil. On practical grounds an adulteration with eucalyptus oil is not to be feared, as that oil is more costly.

Calamus Oil.—Reporting on the Japanese calamus root referred to in the previous *Bericht* (see before, p. 326) it is stated that these roots do not differ externally from European calamus roots and are no doubt derived from the same species. They contain 5 per cent. of a highly aromatic essential oil, which is considerably heavier than the German calamus oil, having a specific gravity of 0·991 at 16° C. It boils between 210° and 290° C.; if the distillate be collected in two fractions, the lower portion has the characteristic calamus odour, while the higher boiling portion gives off the peculiar sesquiterpene odour. Japanese calamus oil also differs from the European in solubility, 1 part dissolving in 500 parts of 50 per cent. spirit, the German oil requiring 1000 parts of spirit.

Camphor Oil.—Under this name the light-boiling portion of the crude camphor oil appears to find enormously increasing industrial application as a substitute for turpentine oil. More detailed information is now given concerning its characters and composition. It is stated that after the preliminary runnings, smelling disagreeably of aldehydes and acids, the oil begins to boil at about 158° C. The first fraction, boiling between 158° and 162° C., consists of right-handed pinene, identified by the formation of the hydrochlorate, $C_{10}H_{16}HCl$, as well as of nitrosoterpene, melting at 130°, obtained by treatment of pinene nitrosochloride with alcoholic potash. In the portion boiling between 169° and 171° phellandrene was detected, but in very small quantity; it was identified by its nitrite, melting at 102°. Dipentene was found in camphor oil by Wallach, and the tetrabromide and nitrosylchloride compound may be easily obtained from the fraction boiling at 180°. The occurrence of terpineol in camphor oil has not been determined with certainty. Whilst the formation of a compound having the composition $C_{10}H_{16}2HI$, as well as of terpin hydrate, dipentene and terpinene, rendered its presence highly probable, it was, on the other hand, rendered doubtful by repeated failures to obtain the dipentene dihydrochlorate and tetrabromide. There is also in camphor oil a considerable quantity of a hydrocarbon, boiling about 260° to 270°, from which was obtained the hydrochloric acid compound, melting at 117°, characteristic of the sesquiterpene cubebene. In the highest boiling fractions of camphor oil occurs an intensely blue coloured oil, which is probably identical with the constituent, boiling at about the same temperature, occuring in chamomile, millefolium, wormwood and other oils. The constituents of camphor oil found up to the present are—

Boiling point.	Constituent.	Formula.
158°–162°	Pinene	$C_{10}H_{16}$.
170°	Phellandrene	$C_{10}H_{16}$.
176°	Cineol	$C_{10}H_{18}O$.
180°	Dipentene	$C_{10}H_{16}$.
204°	Camphor	$C_{10}H_{16}O$.
215°–218°	Terpineol	$C_{10}H_{17}OH$.
232°	Safrol	$C_{10}H_{10}O_2$.
248°	Eugenol	$C_{10}H_{12}O_2$.
274°	Sesquiterpene	$C_{15}H_{24}$.

Cananga Oil.—The opinion is expressed that the finer sorts of Java cananga oil can be used for all purposes for which the ordinary qualities of ylang-ylang oil suffice, since both oils are derived from the same plant and the extraordinary differences in quality are due to the more or less perfect methods of preparation.

Chamomile Oil.—In order to prevent as much as possible the original blue colour of this oil from changing to green it is recommended that it should be protected carefully from the influence of light and heat.

Citronelle Oil.—The exports of this oil from Ceylon during the year 1888 are estimated to have amounted to at least double the exports of the previous year, since in the month of August alone the shipments reached 2,322,890 ounces, or four times the average of the same month in the three previous years. This enormous export from Ceylon is driving the production of the oil in the Straits Settlements into the background.

APOTHECARIES AND THEIR CHARGES TWO HUNDRED YEARS AGO.

BY C. J. S. THOMPSON, F.S.SC.

In a previous article on "Pharmacy in the Seventeenth Century" were noticed some of the old forms of administering drugs, and the quaint materia medica of that period. A curious little work entitled 'The House Apothecary,' written by Dr. Gideon Harvey, physician in ordinary to His Majesty, and printed in 1670, which I happened to come across recently, affords a further interesting glimpse at pharmacy two hundred years ago. It would appear that the apothecaries then, like some of their descendants of the present day, created a considerable amount of jealousy with the physicians, for prescribing in certain cases and meddling, generally, "in matters which they did not understand."

The worthy doctor begins by recommending people to prepare their medicine at their own homes, it being a far safer and easier way than sending it to the apothecary to be made, and as a further inducement states, "And you shall also save nineteen shillings in twenty shillings, according to the extravagant rates charged by many apothecaries, in so doing. I must tell you I have oft seen bills of apothecaries risen to twenty, and sometimes thirty pounds in the time of a fortnight, and what is more, I have known an apothecaries' bill so extravagant, that the sum at the bottom of his account amounted to fifty pounds in the space of thirty days, when the ingredients of the whole course could not be computed to stand him in forty shillings." This sounds very like the modern argument we sometimes hear, of elevenpence-halfpenny profit out of every shilling.

The doctor then goes on to inform us that "in preparing medicines at home, you may be certain the ingredients are sound and fresh, and you can have your medicines without attending the apothecaries leisure or having the trouble of sending three or four times to his shop for them, and most important of all, you may be assured in so doing, you shall save nine pounds in ten, and sometimes forty-eight pounds in fifty."

Another treatise written to denounce the overcharge of the apothecaries was 'The Accomplished Physician, the Honest Apothecary, and the Skilful Surgeon,' published and sold at the "Angel" in Duck Lane, in 1656. It attacked the unfortunate apothecary on all sides. It states that if the apothecary finds you costive he sends you a clyster, at the price of half-a-crown, which by consulting the 'Accomplished Physician, etc,' you may learn how to make yourself for three-halfpence. If he apprehends your stomach to be oppressed he orders his man to boil a little cardamoms in water, strain it, and put to it three or four spoonsful of rank oil of sweet almonds, to cause you to vomit and carry off a little phlegm, and for this he charges you half-a-crown, which you can make yourself for twopence.

The author finally confides to the reader "that it is fortunate that the little apothecaries and prescribing surgeons have not much knowledge of the great medicines, such as mercury and antimony, as they would at most times do great mischief with them, using them at unseemly times, as if you laid hold of a club to knock down a louse; such great medicines should only be used by the physicians who should reserve them in secret." Most of the herbs and roots in common use were brought to the town markets and vended by the physical herb-women, who would bring them in baskets to Newgate Market, Gutter Lane, or Covent Garden, and there sell them by the handful, a dozen for a groat. The measures in use were of a very primitive description, such as the fascicle and a pugil.

A quart white glass bottle cost 1*s*. 6*d*., and a green glass retort 8*d*. Plague water at certain times was in great demand, and usually sold at the apothecaries for 3*s*. 6*d*. a pint. The price of most conserves was 2*d*. the ounce, and ointments retailed at 8*d*. an ounce. An ointment that was much in vogue and very popular among the people was unguentum ægyptiacum, similar to the ointment of the great Felix Wurtz. Its composition is somewhat interesting and quaint. "Take of verdigriese 12 drachms ground very fine in a brass mortar, observing while you are powdering to hold your head back from the mortar and keep your mouth and nose stopped, to prevent those venomous steams from getting up into your brain. Then take 3 ounces of honey and 12 drachms of sharpest vinegar, place them in a broad brass pipkin, put in the verdigriese, stir, and boil them on a gentle fire unto the thickness of an oyntment of a purple color." Among the waters in common use the 'Family Physician' gives directions for the preparation of several. The London treacle water, aqua mirabilis, and aqua raphani composita, were noted for scurvy. The London snail water was recommended as an invaluable remedy in consumption, which "owing to the cool, clammy and glutinous substance of the snail, facilitated the expectoration, and repaired the parts consumed." Gascon's powder, or pulvis é chelis cancrorum, was regarded as a valuable medicament, and much esteemed and ordered by the great physicians. It was an expensive mixture, and contained equal parts, in powder, of crab's eyes, the oriental pearl, red coral, white amber, oriental bezoar and the black tops of crab's claws. It was sometimes ordered and taken in the form of pills, mixed with hartshorn jelly. The apothecary's price for this powder was 40*s*. the ounce, or one penny per grain. We are told that if made at home, the cost would only be 13*s*. 1¼*d*. Another preparation exceedingly popular at the same time, but still more ancient, was emplastrum opodeldock of Feliz Wurtz, so much cried up among surgeons beyond the sea. It was a red plaster, composed of wax, venice turpentine, juice of celandine, oak leaves, ammoniacum, galbanum, and vinegar. Then some powdered magnets, and such mysterious compounds as *Crocus Martis*, *Crocus Veneris*, and prepared tutria, were thrown in and all boiled together. I have extracted the following from an old druggist's retail price list of the seventeenth century, which gives a good idea of some of the extraordinary articles kept in the old apothecaries' shops, and the prices they charged. It is headed "Rates and prices currant of Druggs and other commodities, belonging to physick, as they are commonly sold at the Apothecaries and Druggists in London, 1685.

Mother of Pearl	6*d*. per oz.
Crabs eyes	5*s*. 4*d*. per lb.
Crabs claws	1*s*. 6*d*. ,,
Fox's lungs	2*s*. ,,
A mummy	5*s*. 4*d*. ,,
Bone of stags heart	1*s*. 6*d*. ,,
Borax	4*s*. ,,
Saltpetre	10*d*. ,,
Jalap	3*s*. 4*d*. ,,
Rhubarb	14*s*. ,,
Liquorice	1*s*. ,,
A boar's tooth	1*s*. each.
A dead man's skull (cranium humanum) according to size	8*s*. to 11*s*. each.
Musk	5*s*. per drachm.
Bloodstone	2*s*. 8*d*. per lb.
Opium	12*s*. ,,
Elaterium	36*s*. per oz.
Lac Sulphur	3*s*. ,,
Red coral	4*s*. per lb.
Oleum Copaibæ	2*s*. per oz.
Gum acacia	10*s*. per lb."

Besides the above, precious stones in powder, and diamond powder, which was regarded as a powerful poison, commanded very high prices. Such were some of the charges of the apothecary two hundred years ago.

BROMATES OF THE CINCHONA ALKALOIDS.*

BY CLAUDE GRANT JOHNSON, PH.G.

Bromates have of late been receiving some attention as therapeutic agents, although they have not yet come into any general notice. Almost all of the inorganic compounds of bromic acid have been made, but none of its alkaloidal salts seem to have been produced until quite recently. It is claimed for the bromates of the metals that they give all of the effects of the corresponding bromides with the advantage of being more gratefully received by the system, which is able to endure them for a longer time without the unpleasant after effects usually following upon an extended treatment. They have been used in chorea, epilepsy, alcoholism and other diseases with good results. "They are for the most part crystallizable, but many of them decompose when their solutions are heated. When heated to redness, they either give off oxygen, leaving bromides, or give off bromine, and part of their oxygen, leaving oxides."—(Watts).

Barium bromate is important as being the salt from which most of the others are prepared. It is best made by adding to a boiling solution of potassium bromate sufficient anhydrous acetate of barium to saturate it, and allowing it to cool slowly. Barium bromate crystallizes out, while potassiam acetate remains in solution.

Potassium bromate was prepared by adding bromine to a solution of potassium hydrate, forming the bromide and bromate of potassium, the bromate crystallizing from the solution because of its inferior solubility ("KBr is soluble in 1·6 parts of water, $KBrO_3$ in 16·2 parts."—Walker). The bromide remaining in solution was procured as bromate by adding the

* From an inaugural essay. Reprinted from the *American Journal of Pharmacy*, March.

requisite quantity (calculated from the molecular weights) of potassium hydrate, and passing a stream of chlorine through the solution until saturated, when the bromate separated in small, irregular shaped crystals, the reaction being as follows:—

$$KBr + 6KOH + 3Cl_2 = KBrO_3 + 6KCl + 3H_2O.$$

The product was purified by recrystallization. The shape of the crystals depends upon the way in which they are made; from hot solution they separate as needles, but by slow cooling they are obtained as four and six-sided plates, colourless and anhydrous.

Quinine bromate has been successfully used in some forms of neuralgia, "especially those in which evidence existed of malarious or rheumatic influence," the large proportion of easily dissociated oxygen present being supposed to add to its physiological activity. The alkaloidal salts were all prepared by double decomposition between barium bromate and the corresponding sulphates. On platinum or porcelain, heated to redness, they are decomposed with explosive violence, leaving a very slight charred residue. Barium bromate was dissolved in boiling water, a calculated amount of sulphate of quinine added, and the mixture filtered. The filtrate was of a violet blue colour, a circumstance I am unable to explain, the suggestion being offered that it may be due to a compound allied to thalleioquin. Almost immediately, the solution being concentrated, crystals began to separate in small clusters. These were redissolved in a large quantity of water, and set aside for a few days, when the product was procured in the form of handsome stellate clusters of long, white acicular crystals. These were dried upon filtering paper. Exposed to the air for nearly a month, they did not effloresce nor undergo any noticeable change. The solubility in water is very slight, as is indicated by the rapidity with which crystals form. The taste is bitter, and the reaction slightly acid. Dropped upon a heated porcelain lid, the crystals decompose immediately with a slight explosion. Upon concentrating the mother liquor the blue colour was much deepened, and the second crop of crystals had a violet tinge, which can be removed by solution and crystallization. A repetition of the process in somewhat more dilute solution gave the same results, except that the solution was but very slightly coloured at first, but the crystals were no better, and upon concentration the colour was again produced.

Cinchonidine bromate was next prepared, the same process being used. This also gave a blue coloured solution, but the salt was found to be much more soluble than the preceding, requiring a very concentrated solution before crystals would form. The first that were procured were tested for quinine, but none was found. The easy solubility of the salt, together with the colour complication, made the procuring of white crystals a matter of considerable difficulty. By renewed trials from fresh materials, and recrystallizing the products repeatedly, a fairly good specimen was secured. The best plan would probably be to evaporate a moderately dilute solution spontaneously in a cool place or in vacuo. In heating the solution to concentrate it, care must be taken to see that the process be not carried too far, as decomposition is likely to take place and the salt to be spoiled, even if it does not go off in a sudden explosion. These crystals are not as handsome as those of the quinine bromate; they are white and in clusters, but are much smaller than the others, and the separate crystals are flatter and broader.

Cinchonine bromate.—In preparing this salt the colour of the filtrate was observed to be yellow, and remained so, becoming very little deeper, even after much concentration. The salt, while not as difficultly soluble as the quinine, is more so than the cinchonidine salt, but the product has a slight yellow colour. The bunches are smaller and differ in shape from the quinine salt, but are larger than the cinchonidine. They give the usual tests for bromates, are bitter, and neutral to test paper.

Quinidine bromate.—The colour of the solution was a delicate shade of pink, but as soon as heat was applied it began to change and became blue, the colour rapidly deepening into almost a black. In a second attempt, the barium solution being saturated, the pink colour was again obtained. No heat was applied, but after two days the solution was found to have changed to the same blue colour. This salt was also very hard to crystallize, on account of its easy solubility and the difficulty caused by the change in colour, but a product was finally obtained that was colourless. The crystals are very much like the others, being needle shaped, and forming in clusters, explosive on hot porcelain, and of a neutral reaction.

If these salts should come into use as remedies, they could be easily prepared by the above process. It is possible that the differences in solubility shown by the bromates could be made useful as a means of distinguishing the alkaloids of cinchona from each other. Lack of time prevented me from looking into this feature of the subject, but it is worthy of further investigation.

ISO-NITROSO-ANTIPYRIN.*

BY H. C. WOOD, M.D., AND JOHN MARSHALL, M.D.

Before the *Western Druggist* of December, 1888, containing the paper of Professor E. B. Stuart upon "The Incompatibility of Spirit of Nitrous Ether and Antipyrin," had been received, our attention had been called to the remarkable change of colour which occurs when ordinary sweet spirits of nitre has antipyrin added to it. An abstract of the paper of Professor Stuart has already been published in the *Therapeutic Gazette*, and we shall, therefore, simply state the results of our own studies, without allusion to what has been done. All the assertions which are made in this article, whether novel or old, have had their accuracy verified by actual experiment.

The discoverer of antipyrin, Knorr,† found that nitrous acid produces with antipyrin a new compound, to which he gave the name iso-nitroso-antipyrin, and which crystallizes in small bluish-green crystals, is sparingly soluble in water, and has the formula $C_{11}H_{11}N_3O_2$.

The iso-nitroso-antipyrin is not produced unless the liquid to which the antipyrin is added contains free nitrous acid. Thus, potassium nitrite with antipyrin undergoes no decomposition, and the green compound is not generated, but on the addition of a stronger acid to such a solution, nitrous acid is immediately set free and the green compound is formed.

Chemically pure anhydrous ethyl nitrite, the principal therapeutic constituent of sweet spirits of nitre, dissolves antipyrin, but no greenish coloration, indicating the formation of the green compound, is imparted to the solution until the lapse of twenty or thirty minutes.

The production of the greenish coloration under these conditions is due to nitrous acid being set free from the ethyl nitrite by the slow absorption of water from the atmosphere. This decomposition of the ethyl nitrite, with the separation of crystals of iso-nitroso-antipyrin, occurs immediately on the addition of water, as is demonstrated by treating ethyl nitrite containing antipyrin in solution with a few drops of water.

The sweet spirits of nitre of the United States Pharmacopœia, which is a liquid containing about 5 per

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* From the *Therapeutic Gazette*, February 15.

† *Berichte de. Deutsch. Chem. Ges.*, Bd. xvii., p. 2038, 1884.

cent. of ethyl nitrite, almost invariably contains free nitrous acid, varying in quantity from a trace to a visible quantity, *i.e.*, as shown by the slight brownish-red coloration of the liquid which is sometimes observed.

Of six separate specimens of sweet spirits of nitre obtained at the apothecaries', five changed to a greenish colour on the addition of antipyrin; the sixth did not respond; but on examination no ethyl nitrite was found, and therefore it could hardly be expected to contain free nitrous acid.

The fact that chemically pure nitrite of ethyl does not react with antipyrin is another argument in favour of the adoption by the Pharmacopœia of a standard solution of pure nitrite of ethyl, instead of the present uncertain preparation. Of course such solution should be alcoholic, or at least not watery.

The iso-nitroso-antipyrin employed in the experiments here described was prepared by adding the calculated quantity of potassium nitrite to an acidulated aqueous solution of antipyrin. The liquid became at once bluish-green in colour, and in a few minutes there was an abundant production of crystals. These were collected on a filter, thoroughly washed with cold water, and allowed to dry on bibulous paper at ordinary temperature.

In preparing the iso-nitroso-antipyrin it was noticed that the filtrate from the crystals changed in colour from green to brown, and developed a very distinct hydrocyanic acid odour after standing a few hours. The presence of cyanogen was confirmed by the formation of crystals of argentic cyanide in a drop of argentic nitrate solution placed on a watch-glass and inverted over the beaker containing the filtrate.

Dilute sulphuric acid, hydrochloric acid, and acetic acid act upon solutions of iso-nitroso-antipyrin, causing the evolution of cyanogen, and, indeed, a mixture of equal volumes of a saturated aqueous solution of antipyrin and c. p. ethyl nitrite, without the addition of an acid, undergoes decomposition on standing several hours with the evolution of cyanogen. The quantity of cyanogen produced in this decomposition is not large, and therefore could hardly be a cause of serious trouble.

That this decomposition may occur in the stomach was demonstrated by adding iso-nitroso-antipyrin to a ·2 per cent. solution of hydrochloric acid, and keeping the whole at the temperature of the body in a water oven. The quantity of cyanogen evolved is, however, so slight that no danger need be feared. The amount given off in an hour from ·5 gram of iso-nitroso-antipyrin mixed with fifty cubic centimetres of the ·2 per cent. acid solution, is only sufficient to give a few crystals of argentic cyanide with argentic nitrate on an inverted watch-glass, equivalent possibly to less than one-hundred thousandth part of a grain of hydrocyanic acid.

In determining whether the isi-nitroso-antipyrin possessed toxic properties, it was administered under various conditions to dogs and rabbits, but in no case, as the following experiments show, were the slightest untoward effects observed.

Experiment 1.—Very young rabbit: weight, ¾ of a pound. Half an ounce of saturated solution (·375 per cent.) was injected hypodermically; no effect was produced.

Experiment 2.—Young rabbit; weight 1 pound. One-fifth gram was given by the mouth; no perceptible effect, and no reduction of the rectal temperature.

Experiment 3.—Dog; weight about 17 pounds. A paste was made with water of 1 gram of iso-nitroso-antipyrin, and given to the dog on a piece of meat. No deleterious result, or, indeed, any change in the behaviour of the dog, could be noticed.

Experiment 4.—Dog; weight, about 24 pounds. One gram of the compound made into a paste was given to the dog on a piece of meat; no observable effect. After the lapse of an hour another gram of the compound was given to the same dog. The dog was under direct observation for four hours after this last portion was given, and not the slightest change in his well-being could be noticed.

Whether ill effects are produced when a solution of antipyrin and sweet spirits of nitre is administered was determined by giving 1 gram of antipyrin in aqueous solution to the dog mentioned in experiment 2, and followed in fifteen minutes by the administration of ·5 cubic centimetre of c. p. ethyl nitrite contained in the appropriate quantity of alcohol and water to effect its solution; no ill effects resulted.

Three hours after the above administration of antipyrin and ethyl nitrite, separately, a solution containing 1 gram of antipyrin and ·5 cubic centimetre of ethyl nitrite, with alcohol and water, was given to the same dog; no ill effects resulted.

It should be remembered that on administering antipyrin with sweet spirits of nitre, the iso-nitroso-antipyrin may be produced, and that just as much antipyrin is rendered inert or destroyed as was required in the formation of the new compound, and thus the anticipated therapeutic effect of the quantity of antipyrin originally given is not obtained.

NOTE ON EXPRESSED OIL OF ALMONDS.*

The Pharmacopœia Committee of the German Pharmaceutical Association has recently published a new series of improved descriptions and tests. Among these is the following on expressed oil of almonds, which we reproduce here, together with the commentary (after *Arch. d. Pharm.*, 1888, 1111).

Oleum Amygdalarum.—The fixed oil of the seeds of *Prunus Amygdalus*. Light yellow, remaining clear at −10°, of a mild taste and having the specific gravity 0·915 to 0·920. On briskly shaking one volume of fuming nitric acid with one volume of water and two volumes of the oil, a whitish, not red or brown, mixture should be produced, which, after a few (inside of six) hours separates into a firm white mass, and a scarcely coloured liquid.

If 10 parts of the oil are digested with 15 parts of solution of soda (specific gravity about 1·160) and 10 parts of alcohol (specific gravity 0·838), until the mixture has become clear, then 100 parts of water be now added, and the whole supersaturated with hydrochloric acid, an oily layer separates. If this is removed, then washed with warm water, and rendered clear over a water-bath, it will remain liquid at 15° C. This oil should yield, with an equal volume of alcohol, a clear solution, which should not separate any fatty acids at 15° C., and which should not be rendered turbid on being diluted with an equal volume of alcohol.

Commentary.—As has been shown by Peters, the genuineness of the several fixed oils may be, at least partly, judged from the melting and congealing points of their respective fatty acids, and from the solubility of the latter in alcohol. These criteria are particularly useful in the case of oil of almonds, since it consists almost entirely of oleate of glyceryl, while the more common adulterants of it, viz., peanut, cotton-seed and sesame oils (as well as olive oil), contain, besides, more or less of the glyceryl compounds of palmitic, stearic and arachic acids. Heace the melting points of the fatty acids extracted from the latter are higher, and at the same time they are less soluble in alcohol.

The melting points of the fatty acids of the above-mentioned fatty acids are given as follows:—

From oil of almonds	at	14·2° C.
,, olive	,, 24	—29° C.

* From the *American Druggist*, March.

From oil of sesame „ 23·5—35° C.
„ peanuts „ 26·5—35° C.
„ cotton-seed „ 32 —43° C.

It has been found that admixtures of olive, sesame, cotton-seed, and peanut oil, in quantities more than 50 per cent. may be recognized with certainty by the congelation of the separated and clarified fatty acids at a temperature of 16° to 17° C. Smaller admixtures are still recognizable from the fact that the alcoholic solution of the fatty acids (1 in 2), at 16° C. separates particles of fatty acids. Pure oil of almonds, as well as oil of peach kernels (which latter is, however, discovered by the elaidin test), furnish an oleic acid which does not separate any solid fat at 15° C., even after standing for many days, and the alcoholic solution of which (1 in 2) remains permanently clear at 15° C.

We have, therefore, here a method to detect any addition of the foreign oils down to a percentage of 20. The best mode of proceeding is as follows :—put 10 gm. of the oil of almonds to be tested, together with 15 gm. of solution of soda (see above), and 10 gm. of alcohol into a flask holding about 150 c.c., and heat upon a water-bath to a temperature *short of reaching the boiling point*, to prevent spattering of the liquid, when the latter is gently agitated. When the saponification is completed after 15 to 30 minutes, and the liquid has become clear, 100 gm. of warm water are added which produces a perfectly clear solution, if the oil was pure and the soda solution of proper strength. After supersaturation with hydrochloric acid, the oleic acid separates. This is made to collect in the neck of the flask, for which purpose sufficient water is added if necessary. The oily layer is now carefully removed, the flask cleaned, the oil replaced therein and thoroughly agitated with warm water. Enough water is now added to bring the layer of oleic acid again into the neck, and the flask then placed into hot water, until the oily layer is perfectly clear, which sometimes requires several hours. The layer is next transferred into a dry glass, and kept for some time at 15° C. If the oil of almonds was pure, the oleic acid remains permanently clear, but congeals if the temperature falls to 14° or 13° C. On adding to 1 c.c. of the liquid oleic acid 1 c.c. of alcohol (0·838), a clear solution is produced, which remains permanently clear if the test-tube is stoppered and set aside for some hours at a temperature of 15° C. Addition of 20 per cent. of oil of olive, or cotton-seed, or sesame, or peanut are shown by the separation, during this time of small portions of solid particles. With larger proportions of foreign oils, the quantity of these increases. Finally the alcoholic solution of the oleic acid above mentioned (amounting to 2 c.c.) is diluted with 2 c.c. more of alcohol, when it should remain clear. The object of this test is to prove the absence of paraffin oil. If the oil of almond contained, originally, more than $\frac{1}{3}$ of paraffin oil, it does not produce a clear soap solution upon saponification. But small portions of the adulterant accompany the soap as well as the separated fatty acid up to the moment when the second dilution with alcohol is made, when it shows itself by rendering the liquid cloudy. But the amount of alcohol must not be increased, since a separation or cloudiness would then occur even if the oil had been pure.

The above method does not permit the detection of oil of poppy or of sun-flower, since the fatty acids of these oils possess a melting point and solubility in alcohol but little differing from that of oil of almonds. Oil of poppy, however, is detected during the elaidin test, both by the brownish colour of the congealed oil and by the liquid portion, which is either mixed with it or floats above. In the proposed pharmacopœial text above given, the elaidin test has been modified so as to direct parts by volume, in place of parts by weight. Further, the quantity of oil, as compared with acid, has been decreased, since with the new proportions even the fixed oil obtained from *bitter almonds* will congeal after five or six hours. With the old proportion this required often one or two days. At all events more attention should be paid to the quality of the fuming nitric acid, since the whole success depends on the amount of hyponitric acid contained therein.

THE TOXIC PRINCIPLES OF FUNGI.

M. G. Dupetit contributes an elaborate and important paper on the toxic principles of fungi to the *Mémoires* of the Bordeaux Society of Physical and Natural Sciences. The following are some of the more important results at which he has arrived.

Boletus edulis contains a principle capable of causing death by hypodermic injection, but not if taken internally. The poisonous principle is destroyed by heat. The influence of the development of microbes in the juice of the *Boletus* was then tried, and the conclusion arrived at was that these organisms do not in any way modify its toxic properties; the active principle was also proved to be a soluble poison which is weakened by sterilization in the cold. Contact with hydrogen and oxygen had no effect on its toxic properties, but the active principle was destroyed by ozone. It is insoluble in chloroform, ether, alcohol, or methyl alcohol; but contact with alcohol weakens the active principle. The greater part of the poisonous principle can be precipitated by phosphate or tannate of lime, tannic acid, or hydrate of lead. It possesses the essential characters of a soluble ferment, and the author proposes to call it *mycozymase*. When first precipitated by alcohol, mycozymase is white; after desiccation it takes the form of a gray powder, inodorous if quite dry, slowly but entirely soluble in distilled water. The aqueous solution is coloured with a distinct mushroom odour; when heated it yields an abundant flocculent precipitate.

As regards other edible and poisonous fungi, mycozymases, similar to that of *Boletus edulis*, were found in *Agaricus campestris*, *A. phalloides*, *A. rubescens*, *A. vaginata*, and *A. cæsaria*.

Experiments were made on the effect of these fungi on frogs; they were all found, with the exception of *A. rubescens*, to be perfectly innocuous to these animals, while that fungus contains a principle which is extremely poisonous to frogs. The very poisonous fungi *Amanita muscaria*, *A. mappa*, and *A. pantherina*, do not appear to be in the least injurious to frogs, while *A. phalloides* has a very marked action. The principle poisonous to frogs contained in *A. rubescens* is distinct from mycozymase; it is soluble in alcohol and is probably an alkaloid or a glucoside.

ESSENCES OF LEMON AND BERGAMOT—CONCENTRATED LEMON JUICE.*

In the United States Consular reports, No. 64, issued February 16, under the heading "Orange and Lemon Culture in Sicily," we find the following concerning the preparation of essence of lemon, essence of bergamot, raw and concentrated lemon juice, etc., from the pen of Consul Wallace S. Jones.

Essences.—With three strokes of his sharp knife the cutter peels the lemon lengthwise and lets the peel fall into a tub under the chopping block. He then cuts the lemon in two and throws it from his knife into a bucket. He works with wonderful rapidity, and fills from ten to twelve tubs with peel a day, and is paid 5 cents a tub, weighing seventy-seven pounds. His left hand and right index are protected with bands of osnaburgs or leather. Decayed fruit is not peeled, as its oil cells being atrophied yield no essence.

* From the *National Druggist*.

Fresh peel is soaked in water fifteen minutes before the essence is extracted. Peel that has stood a day or two should remain in soak from thirty to forty minutes, that it may swell and offer a greater resistance against the sponge. The operative holds a small sponge in his left hand, against which he presses each piece of peel two or three times, simple pressure being followed by rotary pressure. The women employed in this work run a piece of cane through their sponges to enable them to hold them more firmly. The outside of the peel is pressed against the sponge, as the oil glands are in the epicarp. The crushing of the oil cells liberates the essence therein contained. The sponge, when saturated with the essence, is squeezed into an earthen vessel which the operative holds in his lap. He is expected to press the peel so thoroughly as not to overlook a single cell. This is ascertained by holding the pressed peel to the flame of a candle; should it neither crackle nor diminish the brilliancy of the flame the cells are empty. This process yields, besides the essence, a small quantity of juice and feccia (dregs). The separation of the essence, juice, and feccia soon takes place if the vessels are not disturbed; the oil floats on the juice and the dregs fall to the bottom. These three products derived from the peel have no affinity with each other. As the essence rises to the surface it is skimmed off, bottled, and left to settle for a few days. It is then drawn off with a glass siphon into copper cans, which are hermetically sealed. After the essence has been expressed a small quantity of juice is pressed from the peels, which are then either fed to oxen or goats, or thrown on the manure pile and well rotted, or they would make too heating a fertilizer.

The yield of essence is very variable. This industry is carried on five months in the year. Immature fruit contains the most oil. From November to April, in the province of Messina, 1,000 lemons yield about 14 ounces of essence and 17 gallons of juice. An operative expresses three baskets of lemon peel (weighing 190 pounds) a day, and is paid 20 cents a basket. The essence is so valuable that the operatives are closely watched; they are most ingenious in secreting it about their persons. Six men work up 8000 lemons a day, two cut off the peel, while four extract the essence, and obtain 136 gallons of lemon juice, and 7 pounds of essence. In the extraction of essence, defective fruit—thorn-pricked fruit blown down by the wind or attacked by rust—is used. This fruit is sold by the "thousand," equivalent to 119 kilos or 260 pounds, and thus classified:—1, mixed lemons, as they come from the groves during December and January, of good quality but not always marketable, often from top branches; 2, lemons from March blooms; 3, lemons refused at the packing houses; 4, dropped fruit; 5, shrivelled or deformed fruit.

Prices do not depend exclusively upon the classification of the fruit; the locality where it was grown is taken into consideration as well. Lemons grown on clay soil yield more essence and juice than those grown on sandy or rocky soil.

Dealers sometimes adulterate their essences with fixed oils, alcohol, or turpentine. Adulteration by fixed oils is detected by pouring a few drops of essence on a sheet of paper and heating it. Upon the evaporation of the essence a greasy spot will remain. Alcohol is detected by pouring a few drops of the essence into a glass tube in which a small quantity of chloride of lime has been dissolved. The tube is then heated and well shaken, and its contents being allowed to settle the essence will float on the denser liquid. To detect turpentine pour a few drops of essence on writing paper, and a strong smell of turpentine will remain after the essence has evaporated. The essence of sour orange, mixed with the essence of lemon, produces an aroma similar to that of the essences of bergamot; the latter is much used by confectioners in flavouring ice creams, etc.

Equal parts of lemon essence and spirit of turpentine, well mixed (mixture known as *essenza vestrincutale*), remove stains from linen and silk fabrics.

In a bergamot essence establishment at Reggio, on the mainland, is to be seen in operation a hand-machine for extracting essential oil. The skin of the unpeeled bergamot is punctured by a system of revolving knives and then gently pressed. It should be borne in mind that the bergamot is spherical in shape, and this machine could not be used on the lemon on account of its shape. A thermo-pneumatic essence extractor, worked by steam power, has also been invented, but the old system is still in general use in Sicily on account of abundant and cheap labour. The method employed for the extraction of essential oil from the lemon (as given above) applies as well to the sweet and sour orange, to the bergamot, and to the mandarin. But a very small quantity of essence of mandarin is made, and but slight attention is paid to the extraction of essence from the orange flower. The essence extracted from the flower of the bergamot is called neroli, and is worth $35 per pound.

Raw and concentrated lemon juice.—When the lemons have been peeled and cut in two, as above stated, they are carried to the press and thrown into large wicker bags, circular in form, made of bulrushes, and are pressed in these bags. If the juice is to be exported raw, only perfectly sound lemons can be used; but if the juice is to be boiled down, one-fifth of the lemons may be of an inferior quality, and two-fifths of them pretty well decayed. The juice from sound lemons is yellowish in colour, and gives a pleasant aroma; its density decreases with age. With all classes of lemons the yield of juice and its acidity varies considerably from month to month. The amount of juice increases from October to April, its acidity and density decrease, and the same is the case with the density of the essence, owing to the winter rains.

The manufacturing of essential oil and of lemon juice is quite lucrative, but manufacturers, to avoid being taxed on their business, are reticent as to their profits.

An addition of 5 per cent. of alcohol will prevent raw lemon juice from spoiling. Lemon juice is adulterated with salt or tartaric acid. Raw and concentrated lemon juice is exported in casks of 130 gallons capacity. It requires 1500 lemons to yield 26 gallons (1 hectoliter) of raw juice, while it takes 2500 to yield the same quantity of concentrated juice, and 200,000, more or less, according to their acidity, to give a cask. Experience has shown that the lemons of the province of Messina, especially from the eastern shore, contain more acidity than the lemons grown elsewhere in Sicily.

The value of lemon juice is governed by its acidity. The rule is that concentrated lemon juice shall show 60° of acidity (the juice extracted from the bergamot or the sour orange must show 48°, or one-fifth less than that derived from the lemon; it also sells for one-fifth less than lemon juice). Formerly a citrometer, known as Rouchetti's gauge, was used to ascertain the per cent. of acidity; now, however, resort is had to chemical analysis, which is more satisfactory both to seller and buyer. Lemon juice is used in the printing of calicoes.

Of late years a new article, known as "vacuum-pan concentrated natural juice of the lemon," has been manufactured here. The juice concentrated by this method contains 600 grains of crystallizable citric acid for every quart. It is exported in casks containing 112 gallons, in half and quarter casks. It is also shipped in bottles of 500, 300, and 150 grains each. This concentrated juice is as limpid as first quality oil.

There is an establishment here, probably the only one of its kind in Italy, that prepares crystallized citric acid. It takes from 340 to 380 lemons to make a pound of citric acid, which sells at about 43 cents.

The Pharmaceutical Journal.

SATURDAY, APRIL 6, 1889.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE MEDICINE STAMP ACT.

ALTHOUGH the profession of inability to comprehend the provisions of the Patent Medicine Stamp Act is not one that we can regard as being creditable to the members of the pharmaceutical body, there are so many instances in which that appears to be really the case, and the subject is now attracting so much attention with chemists, it may be useful to point out again some of the conditions by which liability to the payment of medicine stamp duty is incurred. In attempting to do this reference may be made in the first place to the three main circumstances which determine the liability of preparations to medicine stamp duty, viz., that they have been patented, or that the vendor or person on whose behalf they are sold claims either to have an occult secret or art for making them, or claims to have an exclusive right or title to making them. But these are by no means the only points to be considered. The Act also specifies three other conditions as entailing the same liability. These conditions consist either in holding out medicinal preparations to the public as nostrums or proprietary articles, or in holding them out as specifics, or recommending them as beneficial for the prevention, cure or relief of any disorder or complaint incident to or in any wise affecting the human body. And as regards the latter condition, the Act provides that it shall apply, not only to secret or proprietary articles of the kind commonly known as patent medicines, but also to every kind of medicinal preparation whatever. It would seem that the very wide scope of the Act in this respect is too much lost sight of by those who complain of what they regard as arbitrary applications of it. This very comprehensive character appears indeed to have been for a time very much overlooked by the Inland Revenue authorities, and it is only since complaints were made of the unequal enforcement of the Act that their attention has been directed to numerous instances in which the provisions of the law was not complied with. Hence their increased activity of late, and hence has arisen much of the inconvenience and vexation experienced by persons who were not acting in strict conformity with the law, either knowingly, or, more frequently, from inadvertence. But we have not yet done with the consideration of the conditions which entail liability to Medicine Stamp Duty, and in regard to the point of proprietary claim it is held by the Inland Revenue authorities, who are the administrators of the Act, that the use of a proper name in the possessive case in the designation of a medicinal preparation constitutes a holding out of such preparation as a nostrum or proprietary article. It was upon that ground the claim for payment of medicine stamp duty was made in respect of Blaud's pills, Christison's pills, etc., and although the sale of these and similar articles without the stamp had been long carried on without interference, the Board considered that there was really no ground whatever for objecting to comply with the provisions of the Act when they were enforced. But as a matter of fact the Inland Revenue authorities, although holding this view, displayed a liberal disposition to take into account, so far as they could, the inconvenience arising from the necessity of enforcing the law, and through the intervention of the President of the Society they consented to allow the use of labels on which the name Blaud's or Christison's, etc., was placed in brackets after the descriptive designation, or to allow their being sold unstamped as before, provided the ingredients of which the preparation were composed were specified on the labels.

In regard, therefore, to the liability to medicine stamp duty by reason of a claim to proprietorship, if the interpretation put upon the use of the possessive case by the Inland Revenue authorities must be accepted, and if it be desired to avoid that liability, one or other of the modes of doing so allowed by them must be had recourse to. There is, in fact, no other alternative short of attempting to obtain a repeal of the Act. The letters from the Board of Inland Revenue of the 5th and 22nd November, 1887, leave no doubt on this point, and we have not yet learnt that anyone has thought it desirable to dispute its authority in a court of law. Mr. PROCTOR'S idea that the decision of the Board had been reversed is entirely erroneous, as mentioned last week, and as he again refers to his belief that such was the case we must point out that though the opinion of counsel was as he states it that opinion did not count as affecting the matter practically. It will be convenient to refer here to the further misconception Mr. PROCTOR labours under in supposing that there is in Mr. ALPE'S excellent little handy book on the Medicine Stamp Acts any indication that the use of a label "Blaud's Pills" would not involve stamp duty. There is nothing to justify such an inference. Blaud's Pills are allowed to come under the exception made in the case of medicines prepared according to the British Pharmacopœia upon the ground that they are prepared in

accordance with a formula in the French Codex and subject to the same condition that applies in the former case, viz., that there is a statement to that effect on the label, as suggested in the letter from the Board of Inland Revenue of November 22, 1887. By overlooking this requisite for ensuring exemption from duty, the assumption to which Mr. PROCTOR thinks he has a right might lead him into trouble, as well as those who accept his dictum on this point. This concession was indeed one of the points gained in the settlement arrived at with the Board of Inland Revenue, and though Mr. PROCTOR may consider that "a very poor achievement," we venture to think that if he refers to the letter above mentioned he will perceive that while the achievement might well have been very much less, it did furnish chemists with an easy means of continuing the sale of articles in question without liability to stamp duty. What could be required more than that we fail to perceive.

But to return to the subject under consideration, it will be evident from what has been said, that so long as the present Act remains in force, exemption from liability to stamp duty in the case of such articles as Blaud's or Christison's pills can only be secured by conforming with one or other methods that the Board of Inland Revenue has consented to recognize, either by putting the name between brackets after the description, or by giving the formula on the label, or by stating upon the label that the preparation is made according to the British Pharmacopœia, and in the particular case of Blaud's pills that they are made according to the Codex formula. However, when all that has been done there are still possibilities of involuntary infringement of the law. These have relation to the various methods of recommending medicinal preparations, and they may even in some instances extend so far as the requisite directions or information required by persons using them. Any medicinal preparation whatever, whether secret or official, may become liable to stamp duty, not only on account of the label it bears being of such a nature as to indicate a claim to proprietorship, but also when the label describes it as being applicable for the prevention, cure or relief of any malady or ailment of the human body. Apparently the means of avoiding liability on that ground would be to omit any such statement from the labels, but that alone is insufficient for the purpose. In this respect the Act states that if any medicinal preparations whatsoever are held out or recommended to the public for particular medicinal purposes they are thus rendered liable to stamp duty, whether that recommendation be on the label or any public notice or advertisement or handbills, written or printed papers. The liability to stamp duty on that account holds good not only in the case of preparations that are at any time being recommended in this way, but also in the case of such as have been so recommended at any previous time, or shall be at any subsequent time. So that even a preparation of the British Pharmacopœia may become liable to stamp duty in this way if it be described in a circular as being beneficial for a certain ailment. In like manner a preparation that has long been sold without liability to stamp duty may be made liable if it be thus described at any time in a circular handbill or advertisement, and the discovery of a long forgotten notification of a similar character might serve to establish the liability of an article that was otherwise in itself exempt. In dealing with the question as to medicine stamp duty, therefore, it is necessary to take all these circumstances into account; but although the restrictive web cast over the sale of medicinal preparations by the Act is very comprehensive, as, indeed, it was intended to be, we cannot believe that its provisions are beyond being understood, or that with the assistance to be obtained from the officers of the Inland Revenue Board there ought to be any difficulty in avoiding the inconvenience that must necessarily result from disregard of it.

We wish to draw attention to the announcement of the School of Pharmacy of the Pharmaceutical Society which appears on the second page of the advertisements in last week's number of this Journal. It will be seen that new courses of lectures on Chemistry, Botany, and Materia Medica will be commenced after Easter. Professor Dunstan will lecture on Chemistry, including a complete course on Organic Chemistry. Professor Green will lecture on Systematic Botany, with especial reference to medicinal plants, in the Garden of the Royal Botanic Society, Regents Park. Mr. Holmes will deliver a course of lectures, supplemented by microscopical work in Vegetable and Animal Materia Medica. The Chemical Laboratories will be open daily for practical instruction under the direction of Professor Attfield and the Demonstrator, and the Laboratory for instruction in Practical Pharmacy and Dispensing will be open under the direction of Mr. Joseph Ince. Students will find it advantageous to enter the School at this time when new courses of lectures are being commenced. Full information and advice can be obtained by applying to any of the Professors or Lecturers.

* * *

An Evening Meeting in London of the Pharmaceutical Society will be held on Wednesday next, the 10th inst., at 17, Bloomsbury Square, when a paper on "The Iodine Absorption Equivalent of Essential Oils," by Mr. R. H. Davies, will be read. The chair will be taken at 8 o'clock, but the Lecture Theatre will be open an hour earlier to allow of the inspection of any specimens or apparatus that may be exhibited.

* * *

There will also be an Evening Meeting of the Pharmaceutical Society held in Edinburgh at the Society's House, 36, York Place, on Tuesday, the 9th inst. The papers to be read on that occasion are a "Note on Methyl Orange," by Mr. D. B. Dott; "Action of Tartaric Acid on Mercuric Chloride," by Mr. D. B. Dott; "Glycerites of Ferrous Salts," by Mr. C. Arthur; "Liquor Calcis Saccharatus," by Mr. C. Arthur; "A Simple Arrangement for Rapid Percolation," by Mr. C. Arthur; and a "Note on the Colouring Matter of Green Euonymin," by Mr. W. Gilmour. The chair will be taken at half-past 8 o'clock.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, April 3, 1889.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Messrs. Allen, Atkins, Butt, Cross, Greenish, Hampson, Hills, Martin, Newsholme, Nichol, Richardson, Robbins, Savage, Schacht and Southall.

The minutes of the last meeting were read and confirmed.

The Late Mr. John Williams.

The President reported that he had received a note from the brother of the late Mr. John Williams, expressing his appreciation of the kindly expressions of the Council at the last meeting, and of the resolution then passed, and informing him also that Mr. Williams had left a legacy of £100 to the Benevolent Fund, free of duty. In a subsequent letter, the writer had expressed his intention of continuing his late brother's annual subscription of two guineas, *in memoriam*.

Elections.

MEMBERS.

Pharmaceutical Chemists.

The following having passed the Major examination, and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Baxter, George Munnerley.....Chester.
Bulmer, Bethel.....Ryde.
Lucas, Edward William.....London.

Chemists and Druggists.

The following, who were registered as being in business on their own account before August 1, 1868, having tendered their subscriptions for the current year, were elected "Members" of the Society:—

Bruce, Alexander Keiller .....St. Andrews.
Rose, Charles ....New Brighton.

ASSOCIATES IN BUSINESS.

The following having passed their respective examination, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Minor.

Bice, James.....St. Austell.
Bisset, James .....Burntisland.
Broome, Bertie.. .....Woodford.
Chisholm, Alexander.....Sheffield.
Cockcroft, John William ..... Huddersfield.
Constance, Sidney William ...London.
Elliot, William Marshall .....Coldstream.
Hatfield, George William ... ..London.
Hind, William Tom .....Leicester.
Hunt, Frederick Hastings .....London.
Hutchin, L. Albert James.....Cambridge.
Kirkup, George John .....Newcastle-on-Tyne.
Knight, Jesse .....Stoke-on-Trent.
Limbrick, James Alfred.....Swansea.
Mann, William .....Clacton-on-Sea.
Miles, Charles John.....London.
Moon, George William .....Torquay.
Perkins, Frank.....Harrogate.
Webb, John Henry .....Luton.

Modified.

Midgley, Charles.....Manchester.

ASSOCIATES.

The following having passed the Minor examination, and tendered their subscriptions for the current year, were elected "Associates" of the Society:—

Attenburrow, James .....Eastbourne.
Havard, Henry Lewis.....Penclawdd.
Lewis, David John .....Aberystwith.
Maxwell, Thomas Wellwood...Montrose.
Smith, William John .....Newcastle-on-Tyne.

APPRENTICES OR STUDENTS.

The following having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Allwood, William Smithurst...Mansfield.
Bell, Peter .....Edinburgh.
Boyce, Herbert George .....Downham Market.
Carmichael, James .....Perth.
Chettle, Herbert Tovey .....Trowbridge.
Clark, Peter Skinner .....St. Andrews.
Clarke, James ....Liverpool.
Davies, James Griffith .....Rowston.
Francis, John Hancorne.....London.
Geen, Charles Alfred .....Exeter.
Humphreys, Griffith Richard...London.
Innes, John ....Douglas.
Jones, Thomas Maddock .....Taibach.
Lothian, John .....Coldstream.
North, Guilford Dudley.....Barton-on-Humber.
Riches, Frank Fraser .....Torquay.
Scruby, John Charles .....London.
Williams, David ....Treherbert.
Wilson, Alexander McLellan...Carlisle.
Wood, Willie..... .....Stanningley.
Wyatt, Alvan Lovell .....Stourbridge.

Several persons were restored to their former position in the Society upon payment respectively of the current year's subscription and a fine.

Restoration to the Register.

The name of the following person, who has made the required declarations and paid a fine of one guinea, was restored to the Register of Chemists and Druggists:—

James Roberts Hayes, 115, Norfolk Street, King's Lynn.

Addition to the Register.

The Registrar reported that

James Mordaunt Buckley, The Elms, Dean Road, Willesden Green, N.W.,

having made a declaration that he was in business before the passing of the Pharmacy Act, 1868, and this declaration having been duly supported, his name had been placed on the Register.

Nominations for the Council.

The Secretary reported that he had received *thirty-eight* nominations to fill the fourteen vacant seats on the Council, and the following *seventeen* had declared their willingness to accept office if elected:—

Abraham, Alfred Clay, 87, Bold Street, Liverpool.
Allen, Charles Bowen, 20, High Road, Kilburn, London, N.W.
Bottle, Alexander, 37, Townwall Street, Dover.
Broad, John Morris, 510, Hornsey Road, London, N.
Butt, Edward Northway, 25, Sussex Gardens, Hyde Park, London, W.
Carteighe, Michael, 180, New Bond Street, London, W.
Cross, William Gowen, Mardol, Shrewsbury.
Greenish, Thomas, 20, New Street, Dorset Square, London, N.W.
Hills, Walter, 225, Oxford Street, London, W.

Leigh, Marshall, 46, Dyke Road, Brighton.
Martin, Nicholas Henry, 29, Mosley Street, Newcastle-on-Tyne.
Martindale, William, 10, New Cavendish Street, London, W.
Newsholme, George Thomas Wilkinson, 74, Market Place, Sheffield.
Nichol, Anthony, 99, Botchergate, Carlisle.
Schacht, George Frederick, 52, Royal York Crescent, Clifton, Bristol.
Southall, Alfred, 17, Bull Street, Birmingham.
Watt, James, High Street, Haddington, N.B.

The following *twenty-one* nominees had declined or had not expressed willingness to accept office if elected :—

Barnes, James Benjamin, 1, Trevor Terrace, Knightsbridge, London, S.W.
Bateman, Thomas Henry, 342, High Road, Kilburn, London, N.W.
Benger, Frederick Baden, 7, Exchange Street, Manchester.
Davenport, Horace, 33, Great Russell Street, London, W.C.
Fitch, Robert Owen, 255, Well Street, Hackney, London, E.
Gilmour, William, 11, Elm Row, Edinburgh.
Gulliver, William, 6, Lower Belgrave Street, London, S.W.
Harrison, John, 33, Bridge Street, Sunderland.
Hopkin, William King, 14, Mowbray Road, Brondesbury, London, N.W.
Hugill, John Howden, 14, Miles Lane, London, E.C.
Mann, George Frederick, 14, Holborn, London, E.C.
Marston, John Thomas, 105, London Wall, London, E.C.
Probyn, Clifford, 55, Grosvenor Street, London, W.
Reynolds, Richard, 13, Briggate, Leeds.
Savage, William Dawson, 23, Freshfield Road, Brighton.
Savory, Arthur Ledsam, 143, New Bond Street, London, W.
Squire, Peter Wyatt, 413, Oxford Street, London, W.
Watts, John Newton, 217, Edgware Road, London.
Williams, Thomas Howell, 10, Ascham Street, Kentish Town, London, N.W.
Wootton, Alfred Charles, 42, Cannon Street, London, E.C.
Young, Robert Fisher, Station Road, New Barnet, Herts.

Nomination of Auditors.

The Secretary also reported that he had received *six* nominations to fill the office of auditor, and the following *five* had declared their willingness to accept office if elected :—

Hopkin, William King, 14, Mowbray Road, Brondesbury, London, N.W.
Lescher, Frank Harwood, 60, Bartholomew Close, London, E.C.
Stacey, Samuel Lloyd, 300, High Holborn, London, W.C.
Watts, William Manning, 32, Lower Whitecross Street, London, E.C.
Umney, Charles, 50, Southwark Street, London, S.E.

The following nominee had declined, in consequence of ill-health, to accept office if elected :—

Hodgkinson, William, 198, Whitecross Street, London, E.C.

Resignation of Mr. Symes.

The President said he had received a letter from Mr. Symes, who was not on the outgoing list, as follows : —

"My dear Sir,—I find that the growing demands made upon my time by business are such that I am no longer able to perform the duties which devolve upon a member of the Council with satisfaction to myself. As you are aware, I have of late only reached London by night train, and have returned on the day of arrival. This has caused my attendance at committees to be irregular, and I find myself unable longer to bear so great a physical strain. I have therefore decided, after ten years of active service, to tender you my resignation. I cannot do so, however, without expressing sincere regret that I shall no longer meet colleagues whom I hold in very high esteem.

"Believe me,

"Faithfully yours,

"Charles Symes."

This letter would no doubt be a subject of surprise and regret to all the members. All would admit that during the ten years Mr. Symes had been a member of the Council, and in fact since he had been in business for himself he had been very active in various works appertaining to pharmacy and the Society, and like many men who were very active, he probably had had less leisure than some others who did very little. It was not to be wondered at if his time were seriously engrossed at home, and that it was a serious matter for him to leave his business every month for two, and sometimes three days. Everyone, also, would feel that the strain of night travelling was to be avoided if possible. He should move a resolution, and in addition he should have much pleasure in conveying to Mr. Symes the best wishes of the Council for his prosperity and happiness, and expressing the hope that his experience at the Council table and his association with men who sometimes differed from him very widely on many points had been of such a nature that he would be able in his capacity as a member of the Society to render good service both in Liverpool and elsewhere. He would move, therefore,

"That this Council desires to express its cordial appreciation of the services rendered to the Society by Mr. Symes during the ten years he has been a member of the Council."

The Vice-President said he seconded the motion with feelings of satisfaction and of regret ; it was a satisfaction to him to indorse what the President had said with regard to the services which Mr. Symes had rendered to the Council, and at the same time he could not but regret that the Council was losing so able a member. Mr. Symes represented a very important district, and the loss of the services of young and active men was always to be regretted. Last year the members of the Council were all pained to lose the services of Mr. Woolley, and he ventured to express the hope that before many years both Mr. Symes and Mr. Woolley would again become members of the Council.

The motion was carried unanimously, and the President was requested to communicate the resolution to Mr. Symes.

The President remarked that the Council would no doubt have noticed with regret the presence of a very well-known name amongst those who had not signified their willingness to serve if elected ; but inasmuch as the gentleman he referred to would remain a member of the Council until May, he would not anticipate now what would be said later on. He need hardly say he referred to Mr. Savage.

Reports of Committees.

Finance.

The report of this Committee having been read,—

The President in moving its adoption said as usual at this time of year the receipts from subscriptions and examination fees were somewhat large.

Mr. Atkins asked if there were an exceptionally large number of examinees coming forward.

The PRESIDENT said yes; especially for the Preliminary. The payments were of the normal character, except one made to the agent of the Duke of Bedford for the building materials on the ground taken on lease, which would be disposed of later on probably to advantage. On the Benevolent Fund he was glad to say that the subscriptions were coming in fairly satisfactorily, but the Fund depended largely on the efforts of those who collected subscriptions either as Local Secretaries or volunteers, and if there were any gentlemen in that position who would like to continue their efforts for another month the Council would be very grateful.

Mr. HAMPSON said he presumed some of the large towns were doing very well.

The PRESIDENT said he believed the large towns, owing to the large area to be covered, did not do so well relatively as those of moderate dimensions. Where local secretaries had very much to do he hoped they would find one or two friends to assist them, and it should be understood that if it were necessary to employ clerical assistance in carrying on the Society's work the Council would always be glad to defray the expense. The total subscriptions received to the Fund were £366. On the donation account they had not yet received the legacy from Mr. Williams, but they had received a donation from Mr. Charles W. Lea, of Worcester, who was originally a student in that house, and had been generous to the Society on more than one occasion. It was very pleasing to find that those who had left pharmacy did not forget the claims of those with whom they had been associated in early life. On the donation account £100 was recommended to be invested.

The motion was agreed to unanimously.

Auditors' Report.

The SECRETARY laid on the table the report of the Auditors.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£5 to the widow (aged 53) of a registered chemist and druggist, whose business was sold shortly after his decease, viz., in 1886, and the proceeds had now been exhausted. Applicant has one daughter dependent on her, and earns something by needlework. (Hounslow.)

£5 to the widow (aged 48) of a registered chemist and druggist. Applicant has had eight previous grants, amounting to £75 in all; she is in bad health, and has only slight assistance from relatives. (Manchester.)

£10 to the widow (aged 52) of a registered chemist and druggist, who has had seven previous grants of like amount. (Grimsby.)

Three other applications the Committee had declined to entertain, and one was deferred for further information.

The SECRETARY had reported the death on March 16 of Mr. Joseph Barber, who had been an annuitant on the Fund since 1883.

The VICE-PRESIDENT in moving the adoption of the report said there was only one case which called for any remark, and that was an application from a man who had left the business for forty years, and during that time very little had been known of him. The Committee felt that though legally within the scope of the Fund, such a man had no moral claim to assistance.

The PRESIDENT said he frequently received communications on the subject of the Fund, and would take this opportunity of clearing up some misconceptions which appeared to exist. He desired to repeat what he had often said that the Council was deeply grateful to all who supported the Fund either by donations or subscriptions, but he must remind all their friends, and especially those who took interest in various cases, that the power of the Council to relieve was directly proportional to the amount of funds at its disposal. The fund available for this purpose consisted of the interest on the invested capital and the subscriptions, and many members did not seem to remember that the number of annuitants had been increased very largely. The Council had trusted to the generosity of future subscribers to pay the annuities, which was perhaps a bold policy, but it had proved successful. Still the very fact of its success took up a large part of the annual income which would otherwise be available for casual grants. The Council could not do more than spend the balance of the subscriptions not required for paying the annuities, which had the first claim, as equitably as possible amongst the various applicants. Some people seemed to think that every one had a claim on the Fund, and because £20 or more could not always be given there was an idea that there was some want of sympathy on the part of the Council. When the amount granted was only £5 or £10 it was often said by those interested in the case that the sum was miserably small; in many cases of serious distress no doubt it was, and the Council would be glad to give more, but until a larger amount was subscribed it was impossible to do more than was being done at the present moment. In the financial statement which had just been laid on the table it would be found that the Council had been so liberal in the past year that it had voted away more money than it had received, and at the end of the year there was not enough money in hand to pay the annuities until the subscriptions came in in January. He did not say this to find fault with those who did not subscribe, but simply in order to make it clear how the matter stood. The policy deliberately adopted was that the greatest good which could be done with the limited funds at disposal was in keeping up a large number of annuities of £30 or £35 a year.

The motion for the adoption of the report was then put and unanimously agreed to.

LIBRARY, MUSEUM, LABORATORY AND HOUSE.

Library.

The report of the Librarian had been received, including the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
February	Day . .	597	36	14	25
	Evening .	204	18	3	10

Circulation of books.	Town.	Country.	Total.	Carriage paid.
February . . .	154	165	319	£2 5 6

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

For the Library in London—

Durham University Calendar, 1889.
From the UNIVERSITY.

Royal College of Physicians of London, List of Fellows, etc., 1889. From the COLLEGE.

Royal Institution of Great Britain, Proceedings, No. 82.

— List of Members, etc., 1888.
From the INSTITUTION

Pharmaceutical Society of Ireland, Calendar, 1889.
From the SOCIETY.

Medical Institutions of Glasgow, 1888.
From Professor JAMES CHRISTIE (Editor).

Flückiger (F. A.), Nachweis kleinster Mengen von Arsen, 1889. From the AUTHOR.

West (W.), Additional Localities for the Vascular Plants of the West Riding Flora, 1888.

— The Desmids of Maine, 1888.

— List of Desmids from Massachusetts, 1889.
From the AUTHOR.

American Pharmaceutical Association, Proceedings, 1888. From the ASSOCIATION.
Victoria, Pharmaceutical Register for 1888. From the PHARMACY BOARD.

For the Library in Edinburgh—

American Pharmaceutical Association, Proceedings, 1888. From the ASSOCIATION.
Victoria, Pharmaceutical Register for 1888. From the PHARMACY BOARD.

The Committee recommended the purchase of the undermentioned works:—

For the Library in London—

Bennett and Murray, Handbook of Cryptogamic Botany, 1889.

For the Library in Edinburgh—

Whitla, Pharmacy, 5th ed.
Richter, Inorganic Chemistry.
Stewart and Gee, Elementary Practical Physics.
Goodeve, Principles of Mechanics.

Museum.

The Curator's report had been received, and included the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
February	Morning	542	37	2	22
	Evening	110	17	1	4

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Distilled water of the flowers of *Pandanus odoratissimus*, from Persia. From Mr. J. G. PREBBLE, Bombay.
Leaves and flowers of *Cinnamomum Kiamis*. From Professor VAN EEDEN, Haarlem.
Specimen of Mogador Gum. From Messrs. SYMES and HALLAWELL
Specimen of Japanese Angelica root and of the oil distilled from it. From Messrs. SCHIMMEL and Co., Leipsic.
Fine specimen of Oregon Cascara Sagrada bark. From Mr. J. MOSS, F.I.C.
Microscopic slide of Cascara Sagrada bark. From Mr. J. HART, F.C.S., Manchester.
Specimens of Egyptian Opium and other drugs from the Cairo Bazaars. From Mr. W. MARTINDALE.
Specimens of Cascara Sagrada bark collected in winter. From Messrs. SCHOELLKOPF, HARTFORD and MACLAGAN, New York.

To the Museum in Edinburgh—

Specimen of Salicin, in large crystals. From Messrs. T. and H. SMITH, Edinburgh.

The Committee recommended that a Conversazione be not held this year.

The staff of the Society's School had attended and reported on their respective classes.

The PRESIDENT had been requested to draft the annual report.

The PRESIDENT in moving the adoption of the report said the main part of it was of the usual character, and did not call for any remark. The Committee had thought it desirable to postpone the Conversazione until next year, when it was hoped that one might be held in the Society's premises at which ladies might be present. It was not thought safe to do so in the present state of the approach to the new building. He might supplement the report by saying that since the meeting of the Committee the members of it had had an opportunity of meeting over fifty of the Divisional Secretaries for London in the new Hall, and having a conference with them on the affairs of the Society. He was glad to say that with the exception of two or three who were absent from London, and one who was in ill-health, everyone of the newly appointed Divisional Secretaries had accepted the invitation. It was a source of great gratification to himself and to all the members of the Committee who were present, to see so much interest taken in the Society's work, and he could not help feeling that if it were possible for opportunities of this sort to be more frequent it would be an advantage to all concerned. There were so many things in connection with legislative and educational matters, which either were not understood at all, or only indifferently by the members, that it would be a good thing to give them further knowledge, and above all it was important that the members generally should know the extent of the powers possessed by the Society, and not be under the impression that the Council had powers which it never had and was not likely to have. It was also an advantage to the Council to receive information and suggestions from gentlemen who really took an interest in the affairs of the Society in their immediate neighbourhood; and these gentlemen also themselves were very much pleased to have an opportunity of meeting men whom they had known very well by name, but had never spoken to. He wished to say publicly what he had told these gentlemen at the meeting, that the Council was very much obliged to them for their attendance.

Mr. ALLEN, in seconding the motion, said it was very gratifying to him, having had something to do with the initiation of this movement, to find that there was such a good meeting. He had every reason to believe that that one meeting had been the means of forming one or two friendships which would in all probability last for life. It was also a source of great satisfaction to the Secretary to know that he had someone in every district of London to whom he could apply for information when necessary, and if at any time the Council wished to communicate with these representative men he had not the slightest doubt, from the interest which had been evinced at the first meeting and from the conversation he had had with them, that a conference could be summoned at the shortest possible notice.

Mr. RICHARDSON inquired if the heating apparatus in the new building had yet been properly tried.

The PRESIDENT replied that it had, and appeared to work very satisfactorily.

The motion for the adoption of the report and recommendations of the Committee was then put and carried unanimously.

INTERNATIONAL CONGRESS ON HYGIENE.

The PRESIDENT said a communication had been received stating that at the International Congress on Hygiene and Statistics, which met at Vienna last year, it was decided to hold the next meeting in London in 1891, and asking the Council to appoint two members to serve on the General Committee which was being formed with the view of making the first International Hygienic Congress held in England a success. The communication was signed by Sir Spencer Wells, Sir Charles Cameron, Dr. Edward Frankland, Professor Humphrey of Cambridge, and Dr. Mapother, Dublin, and by Sir Douglas Galton, Mr. W. H. Corfield, and Mr. Shirley J. Murphy, English members of the Committee, and Honorary Secretaries. He suggested that this communication should be referred to the Library Committee, as he took it the feeling of the Council would be that anything which could be done to further such an object should be.

This was agreed to.

RETAILERS OF METHYLATED SPIRIT.

The PRESIDENT said a letter had been received on the previous day from the Secretary of the Manchester

Pharmaceutical Association enclosing a resolution passed at the last meeting, to the effect that the Secretary be requested to bring before the Council of the Pharmaceutical Society the present dubious position of retailers of methylated spirit, with respect to giving a bond before making methylated liniments, and to request the Council to interview the Board of Inland Revenue with a view to an early settlement of the question. This was a very important subject to many members, and long before receiving this communication he had taken the step suggested. He thought he might say that the question had been dealt with satisfactorily, as appeared by an article in the Journal for March 20. At first the authorities at Somerset House held that when an ordinary pharmacist, not being a compounder of spirits, and not using methylated spirit for any manufacturing purposes—and who was not, in fact, a "compounder" within the meaning of the Spirits Act—made the liniments referred to with methylated spirit, he should enter into a bond; but when it was pointed out to the authorities that as these liniments could not be used as beverages *qua* liniments, there could be no real danger to the Revenue, they did not insist upon the bond. There was a question how far the Act justified the contention put forward by the authorities, but it was not thought desirable to insist upon claiming as a right what the authorities were ready to concede as a privilege, but rather to co-operate as far as possible with the authorities at Somerset House in carrying out their onerous duties in the collection of the public revenue.

The Council went into committee to discuss this question more in detail.

Railway Rates.

On resuming,

The President said with regard to a question as to railway rates, the President of the Board of Trade having stated in Parliament that the time for receiving objections to the railway rates proposed by the companies was to be extended to June, it seemed to him that instead of sending the letter, which he was requested to do last month, it would be well for the Law and Parliamentary Committee to consider the whole matter carefully, and see what could be done to protect the interests of their members and the trade.

Mr. Richardson said the question was a very important one to country chemists, and he thought the Society should as a corporate body present a petition against the proposed regulations.

General Purposes Committee.

The report of this Committee included the usual letter from the Solicitor, stating the progress made with cases placed in his hands.

Several other cases of alleged infringement of the Pharmacy Acts had been considered by the Committee, and in five instances proceedings were recommended if the requisite evidence could be obtained.

In reference to the recommendation of the Committee as to the railway rates, the President reported that no communication had been sent to the Railway Companies, and after discussion it was decided to refer the further consideration of the matter to the Law and Parliamentary Committee.

The Council went into committee to consider this report. On resuming the report and recommendations were mainly agreed to.

Honorary Members.

The Council again went into committee to discuss the names of gentlemen who should be proposed as Honorary Members at the meeting in May.

This concluded the business.

Proceedings of Societies in London.

ROYAL INSTITUTION.

Yeast.

A lecture was given on Friday, the 29th ult., by Mr. A. Gordon Salamon, on yeast. The lecturer alluded to the work of Pasteur, who, from his magnificent researches, might be considered the founder of modern views on the subject of fermentation and allied processes, as well as settling the matter of spontaneous generation. These investigations of Pasteur had been of immense commercial importance, effecting a saving of very large sums of money annually in this country. Some idea of the enormous quantities of yeast used or produced in this country annually might be gained from the following figures,—calculated as dry yeast: in brewing, 4250 tons were used for starting fermentation, and 25,500 tons were produced in the process; in distilling 3100 tons were used for producing fermentation; in vinegar making, 125 tons; and in baking 1400 tons were used for raising bread, this latter being imported from abroad and representing a pecuniary value of more than £684,000. The value of the yeast produced and used in the United Kingdom was about £911,500. The theory that fermentation was due to the growth and development of the yeast cell was originally held by Caignard la Tour, whose views were endorsed by Schwann, but were dropped because of their opposition to the views held by Liebig and his followers on the subject. The true explanation was rediscovered by Pasteur, who, by the logical interpretation of accurate experiments, firmly established it; his work has since been taken up and amplified by other observers. The difference between the ferments of definite organized structure like yeast, and the zymases, or so-called soluble ferments, such as the invertase contained in yeast itself, and by means of which it inverts cane sugar before fermenting it, were commented on, the lecturer remarking that the mineral acids possess the same power as soluble ferments of acting on carbohydrates, so that the term "soluble ferment" might also be applied to them. In the case of the organized ferments it appears that the decomposition takes place within the organism itself, alcohol and carbonic acid gas being excretory products. Alcoholic fermentation is not peculiar to any one species or genus of fungi, and the list of those which are capable of producing it is continually being augmented. They are not all equally powerful, however, and their action on different carbohydrates varies very much; for instance, *Saccharomyces Cerevisiæ* inverts cane sugar and ferments glucose, but not maltodextrin; *S. Pasteurianus* and *S. ellipsoideus* can invert cane sugar and ferment maltose and maltodextrin; *S. exiguus* can ferment glucose, not maltose; *S. apiculatus* cannot ferment maltose nor invert cane sugar, but can ferment dextrose and levulose; *Torula* can ferment maltose and glucose, but cannot invert cane sugar; and *Monilia candida* cannot invert cane sugar, but can ferment it without previous inversion. Ordinary yeast, *Saccharomyces Cerevisiæ*, after inverting cane sugar, exerts a selective action on the invert sugar, fermenting all the dextrose first, so that by stopping the action at the proper time, levulose may be obtained nearly pure. The reason why so much yeast is imported into this country for baking purposes, while in brewing on the other hand much more is produced than is wanted for re-starting fermentation, is that different varieties are used in the two operations. For baking purposes it is not the alcohol that is wanted, but the carbonic anhydride, which distends the dough and lightens the bread, and bakers' yeast yields this gas much more rapidly at first than the varieties used in brewing; the lecturer showed graphically by curves, the

proportions produced in given times by bakers' yeast, ale yeast, and porter yeast, respectively. It is also found in brewing that different results may be obtained by using different varieties of yeast, and Hansen, of Copenhagen, has shown how to obtain pure cultures of any variety of yeast, starting from a single selected cell. The method of doing this was described in detail by the lecturer, and consists essentially in inoculating a gelatine medium on a glass slide, picking out a cell with the microscope and marking its position, and allowing it to develope until the colony becomes visible to the naked eye, then transferring some of it with a sterilised needle to a sterilised culture fluid. The lecture was illustrated by projecting on a screen a series of microphotographs of the different varieties of yeast.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of this Association was held at 103, Great Russell Street, on Thursday, March 28, Mr. E. J. Millard, President, in the chair.

The minutes of the previous meeting having been read and confirmed, the President called on Mr. R. Winfrey to read his paper entitled "Some Reasons why the Present Pharmacy Bill should not become Law."

This paper dealt with the author's objection to enforced curriculum unaccompanied by increased protection, and condemned the action of the Pharmaceutical Society with regard to the abortive attempts at legislation.

The paper gave rise to a lively discussion, in which the author's views were supported by Messrs. Blackham and Crisp, and opposed by the President, Messrs. Millhouse, Ellwood, Ashley Rogers and Stark, Mr. Winfrey's views being in a minority.

Mr. Winfrey having replied, the proceedings terminated.

Parliamentary and Law Proceedings.

Prosecution under the Pharmacy Acts.

At the Stoke-on-Trent County Court, on Monday, Charles Wm. Rawlins, of 69, London Road, Stoke-on-Trent, was sued by the Council of the Pharmaceutical Society of Great Britain to recover a penalty of £5 for, on the 16th of February last, selling, or keeping an open shop for the retailing, dispensing, or compounding of poisons, contrary to the provisions of the Pharmacy Act, 1868; and a further penalty of £5 for that defendant, on the 16th of February last, used, assumed and exhibited a name, title, or sign implying that he was registered by the Pharmaceutical Society, contrary to the provisions of the Pharmacy Act, 1852.

Mr. Grainger, barrister, London, was for the plaintiffs, and Mr. Boddam, barrister, Hanley, appeared for the defendant.

In opening the case for the plaintiff, Mr. Grainger said that in August, 1886, the defendant purchased the business of a duly qualified chemist and druggist, named Wm. Shirley, and for some time he carried on that business. As he was not legally qualified to do so he was communicated with by the Pharmaceutical Society, and there was then a pretended transfer of the business to defendant's stepfather, a person named Edwards, who was a duly registered chemist, Edwards giving Rawlins a bill of sale on the contents of the shop as security for his money. Some little time afterwards Edwards died, and upon Mrs. Edwards being communicated with by the plaintiffs she contended that she had a right, under Section 16 of the Pharmacy Act, 1868, to carry on the business as administratrix of her husband so long as such business was conducted by a duly qualified assistant. Mr. Grainger contended that there was really no transfer of the business from Rawlins to Edwards at the time the bill of sale was given, and that therefore Mrs. Edwards was not entitled to carry on the business at all. The premises, he said, were known as the West End Drug Stores, and it was a noticeable fact that all the labels which emanated from the place described Edwards as being the manager. Upon the rate-books Rawlins appeared as the tenant.

Evidence was then called, and it was proved that on February 16 last, a lad, named Thomas Keeling, purchased at the West End Drug Stores two pennyworth of belladonna liniment, and a mixture containing laudanum, which upon being submitted to analysis at the hands of Mr. Ernest John Eastes, assistant to Professor Attfield, were found to be what they purported to be. Upon the sale of the articles, the bottle in which the liniment was purchased had put upon it a label setting forth the name of Edwards as manager of the West End Drug Stores.

The sale of the business from Shirley to Rawlins having been proved, as well as the fact that the defendant was rated for the premises, Mr. Boddam submitted for the defence that Rawlins was not carrying on the business; it was managed for Mrs. Edwards by Arthur Sinzininex, who was a registered chemist and druggist. This was a perfectly legal proceeding, and in support of his contention, he quoted the case of the Council of the Pharmaceutical Society *v.* The London and Provincial Supply Association, Limited. Rawlins, he said, had explained to the rate collectors that he was not the tenant of the house, and that he simply paid the rates on behalf of his mother, who was the tenant.

The defendant was then put in the witness-box, and after deposing that his mother was tenant of the shop, he said that the invoices of goods were sometimes made out to him, sometimes to his mother, and sometimes to the West End Drug Stores. He paid for the goods out of the money taken at the shop. He handed over to his mother the money taken at the shop, and it was upon this that she maintained herself and family.

Cross-examined by Mr. Grainger he admitted that his step-father never paid him any money under the bill of sale; that in fact, the bill of sale was given under solicitor's advice, for the purpose of satisfying the Pharmaceutical Society. He also admitted a letter written to the plaintiffs by his solicitor on February 26 last, in which it was stated, "Mrs. Edwards has removed from this house (the West End Drug Stores) and Mr. C. W. Rawlins assists in the management of the business." He had now, on behalf of Mrs. Edwards, sold the business to the landlord of the premises, a person named Steers.

Arthur Sinzininex proved that in 1887 he entered into a written agreement with Mrs. Edwards to manage the business for her at a certain weekly salary.

The Judge said he had not the slightest difficulty in deciding what his judgment ought to be in the case, for the facts were as plain as they could possibly be. The business was clearly Rawlins's. The defendant had no doubt been acting in the best way he could for his mother, but he had been acting wrongfully in trying to defeat the Acts of Parliament. There must be judgment for the plaintiffs for the two sums claimed, with costs.

Weights and Measures Bill..

In the House of Commons on Thursday, March 28,

Sir M. Hicks-Beach, in moving the second reading of this Bill,* said that he had received many communications with reference to it, and finding that the provisions with respect to the baking trade originally

* A summary of this Bill will be found in the Journal for March 16, p. 745.

contained in the Bill were open to many objections, he had decided to omit them altogether. The Bill as it now stood might be divided into two parts—one making certain amendments of the law with the view of giving power to local authorities to secure regular and systematic inspection in order to prevent fraud in the use of weights and measures, and the other extending throughout the country the provisions which already existed as to the sale of coal by weight in the metropolis, with the view of preventing the frauds now often committed on poor persons. He should be happy to receive any further communications in reference to the Bill, and to give them his consideration before the Bill reached the Committee stage.

Mr. Cremer did not wish to delay the progress of the Bill, but desired to have an assurance from the right hon. gentleman the President of the Board of Trade that he would seriously consider any amendments that might be brought forward in Committee for the purpose of putting an end to the frauds now perpetrated on the poor by coal dealers in the metropolis.

Mr. Firth hoped that the Bill might pass a second reading; but expressed regret that it perpetuated an anomalous state of things with regard to weights and measures in this country.

Mr. Tomlinson said that when the Bill reached Committee he should ask the right hon. gentleman to consider the expediency of omitting large consumers of coal from its purview. It might be very well to protect poor consumers, but the provisions would be objectionable in the case of large buyers.

The Bill was then read a second time.

Sir M. Hicks-Beach moved that it should be referred to the Standing Committee on Trade.

The motion was agreed to.

Sale of Patent Medicines.

In the House of Commons, on Tuesday, April 2, Mr. Gray gave notice of his intention to call attention to the sale of patent medicines and to move a resolution. The motion is set down for Tuesday, April 30.

Reviews.

Angewandte Pflanzenanatomie. Ein Handbuch zum Studium des anatomischen Baues der in der Pharmacie, den Gewerben, der Landwirthschaft und dem Haushalte benutzten pflanzlichen Rohstoffe. Von Dr. A. Tschirch. Vienna and Leipzig: Urban and Schwarzenberg.

This is the first volume of a new work by Dr. Tschirch which aims to treat in a fairly exhaustive manner on the comparative anatomy of plants. It will serve rather as an introduction to a further volume in which the peculiarities of structure which characterize the various members of plants will be examined in detail, and hence in this first volume the author is occupied in discussing the individual elements of which the different vegetable tissues are composed. He aims not only at giving a full description of the great variety of existing elements for the benefit of an advanced student, but also at assisting a learner in his early investigations and enabling him to attack for himself the various anatomical problems which meet him during his examination of the vegetable organisms. The early chapters of the book furnish a tolerably complete account of the apparatus necessary or advantageous in botanical work, and the methods most useful in preparing tissues for examination. Immediately following these the author deals with the micro-chemical and other reagents of most value in bringing out points of structure and demonstrating the peculiarities of the various constituents of vegetable tissues. The work here is likely to be of considerable value to the student, who is often at a loss to find means of discrimination between substances having close resemblances. The author covers about the same ground as Poulson in his student's handbook to the study of vegetable histology, but though not so rich in detail as the latter, he gains by putting his information into a more condensed form and therefore with a smaller compass.

The ground having been thus cleared, Dr. Tschirch starts with the conception of the vegetable cell as the unit from which all the complex structures met with in plants are derived, and devotes the early part of this volume to the detailed study of this simple form and its modifications. The first section dealing with cell contents is of great value, being much fuller than is the case in most treatises on the subject. He deals not only with the structures as seen, but considers carefully their chemical and other peculiarities. In discussing the cell wall he is working more upon the lines of other writers, but his examination of the subject is very full. The section dealing with the degradation products of cellulose especially deserves a careful study. The chapters on the multiplication of cells scarcely come up to the expectations a reader will form from the perusal of the previous ones. The behaviour of the nucleus in the processes of multiplication is not set forth so amply as its importance deserves. This is rather to be regretted, in the light of the recent publications of Strasburger on this subject. In the remainder of the volume the author discusses critically the combinations of cells into the different forms of tissues, and shows how each modification met with is brought about. The different anatomical elements are considered under sections grouped according to their physiological significance, which method of treatment, by no means universally followed by writers on the subject, presents considerable advantages. It is well always to associate structure and function in studying the different mechanisms, whether in animal or vegetable organisms, for it is only in the light of the latter that the former can be properly understood. The author accordingly treats of the tissues from this point of view, dealing with the external or protective tissues, the absorptive system, the assimilation system, the system for conducting fluids and gases, etc., instead of working on the old lines of epidermis, ground tissue, vascular bundles, etc., which are regulated by anatomical considerations only. There is a little disadvantage, however, connected with this mode of treatment, in that structures closely related to each other anatomically are found separated somewhat in the book. Thus lenticils are found treated of at some little distance from cork, though so intimately connected with the latter.

The book is illustrated by upwards of 600 figures, most of which are drawn by Dr. Tschirch from his own preparations. These are extremely well selected, and throw a great light upon the structures found. A little objection might be taken to some of the figures of cell contents, notably to those of certain aleurone grains, which seem rather diagrammatic than natural, but of the illustrations as a whole one can only speak in terms of appreciation.

The volume is a valuable contribution to botanical literature.

Lehrbuch der Pharmacognosie. Von Dr. Jose Moeller, mit 237 Abbildungen. Vienna: Alfred Holder. 1889.

The author, who is Professor of Pharmacology and Pharmacognosy in the University of Innspruck, ex-

presses in the preface his opinion of the relation the scientific manual or text-book should bear to the student, and it is evidently on the ideas herein expressed that the work is carried out. He believes that the object of a text-book should be to make the pupil acquainted with the principles and methods of investigation, and to educate him in the practice of turning to account the knowledge he acquires, rather than to fill his mind with a mass of material, a large proportion of which will be sunk in the sea of forgetfulness as soon as his examinations are passed or his degree is obtained. When in after life new scientific problems present themselves for solution in ordinary business, the knowledge of the methods of investigation and of the instruments suitable for his purpose previously acquired at college, will then, the author believes, prove invaluable.

The various articles of materia medica are treated of under the respective heads of thallophytes, leaves, flowers, fruits, seeds, herbs, barks, woods and subterranean parts of plants (including rhizomes, corms, tubers, roots, bulbs, etc.), galls, parts of plants met with in the form of powder (including starch, lycopodium, lupulin, kamala, etc.), hairs, plant products and secretions without definite structure, and lastly, products derived from the animal kingdom.

All the more important articles are accompanied by excellent representations of the microscopical structure, and where these are copied from the works of other authors the source is carefully acknowledged.

The description of each article includes the geographical source, the external and the microscopical characters of the drug, the chief constituents and the proportion in which they are found, their use, the adulterations or substitutions likely to be met with, and the means of detecting them. Errors, which will occasionally creep into the most carefully edited works, are extremely few.

The statements are remarkably condensed, but clear and concise, so that it seems hardly possible to reduce the sentences to fewer words. The result is a very portable and convenient book.

Being written to meet the requirements of German readers, it naturally contains the description of many drugs not official and scarcely officinal in this country, such as salep, burdock, *Levisticum*, *Ononis*, *Pimpinella*, *Saxifraga*, *Anacyclus officinarum*, etc. On the other hand, a few drugs used in this country, but not official in Germany, such as *Pareira brava*, do not occur in its pages. But there can be little doubt that it will prove a most useful manual for all students who read German, and in view of the great value of microscopical characters in recognizing drugs and detecting adulterations it could be wished that a similar planned and executed work were published in the English language, comprising a similar account of the drugs used in English-speaking countries.

Obituary.

Notice has been received of the death of the following:—

On the 23rd of February, Mr. Joseph Burton, Chemist and Druggist, Cambridge Road, London. Aged 68 years. Mr. Burton had been a Member of the Pharmaceutical Society since 1869.

On the 17th of March, Mr. Allen Harrington, Chemist and Druggist, High Street, Needham Market. Aged 66 years. Mr. Harrington had been a Member of the Pharmaceutical Society since 1870.

On the 23rd of March, Mr. James Kirkman Bennett, Chemist and Druggist, Westhoughton, Lancs. Aged 71 years.

On the 26th of March, Mr. William Barnett, Pharmaceutical Chemist, St. James's Street, Brighton. Aged 70 years. Mr. Barnett had been a Member of the Pharmaceutical Society since 1850.

On the 26th of March, suddenly, Mr. Edward Stewart Payne, Chemist and Druggist, Elmwood Street, Leeds. Aged 44 years. Mr. Payne was an Associate of the Pharmaceutical Society.

On the 27th of March, Mr. Peter Wootton, Chemist and Druggist, Luton, Beds. Aged 74 years.

On the 27th of March, Mr. Henry Ridley, Chemist and Druggist, Hockley Hill, Birmingham. Aged 80 years.

BOOKS RECEIVED.

THE MEDICAL ANNUAL AND PRACTITIONERS' INDEX. 1889. Seventh year. Bristol: J. Wright and Co. From the Publishers.

ELEMENTARY BANDAGING AND SURGICAL DRESSING. By WALTER PYE, F.R.C.S. Third Edition: Bristol: J. Wright and Co. 1889. From the Publishers.

PRACTICAL ORGANIC CHEMISTRY. By SAMUEL RIDEAL, D.Sc. London: H. K. Lewis. 1889. From the Publisher.

ELEMENTARY INORGANIC CHEMISTRY: THEORETICAL AND PRACTICAL. By A. HUMBOLDT, F.R.S.E., F.C.I., F.C.S. London: Blackie and Son. 1889. From the Publishers.

INTRODUCTION A L'ETUDE DE LA CHIMIE DES ANCIENS ET DU MOYEN AGE. Par M. BERTHELOT. Paris: G. Steinheil. 1889. From the Publisher.

DIGEST OF CRITICISMS ON THE UNITED STATES PHARMACOPŒIA, Sixth Decennial Revision (1880). Published by the Committee of Revision and Publication of the Pharmacopœia of the United States of America. Part I. From the Committee.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

MEDICINE STAMPS.

Sir,—In your issue of March 30 you append a note to my letter to correct what you suspect to be a misconception on my part.

The conclusion apparently come to at the close of the correspondence between Messrs. Macfarlan and the Board of Inland Revenue was that pills bearing the label "Blaud's Pills" required a stamp.

As I understand the matter, shortly after that time the proprietors of the *Chemist and Druggist* took counsel's opinion, with the result that this label does not involve liability to duty.

Subsequently Mr. Alpe, of the solicitors' department, Inland Revenue Office, published a statement on the subject in his 'Handy Book of Medicine Stamp Duty.' On page 72 he gives the general statement that "prefixing a proper name in the possessive case" . . . . . "gives a medicinal preparation the character of a nostrum," and on page 73 he says, "To this rule there are two exceptions, first in favour of B.P. preparations," to which he adds, "This exception has been extended to a medicine, 'Blaud's pills,' the formula of which appears in the French Pharmacopœia."

I know it is open to you to say Mr. Alpe is not the Board. But as the Board in their correspondence refers us for further information than their letters contain to the hand book of Mr. Alpe, I think I have a right to assume that the label "Blaud's pills" does not now involve stamp duty. Further on in your note you say that I am certainly under a misconception in supposing that the Council took no part in the settlement which was brought about. I did not say that the Council took no part in it, though I

did say that the burden of the battle fell upon an individual chemist. If I am mistaken in this point, and the Council really effected the settlement that the label "Blaud's Pills" was to continue to involve stamp duty, it was a very poor achievement.

However, I am glad to think that they are open to take up work of this kind, and I hope when they do so again the results will be such as to earn a warmer gratitude than that settlement was calculated to kindle.

11, *Grey St., Newcastle.* BARNARD S. PROCTOR.

THE COMING COUNCIL.

Sir,—As the time for the election of members of Council is at hand, may I be allowed to express the opinion that it is highly desirable candidates should declare their opinions previously on the following questions :—

The Stamp Act and its administration.

The sale of medicated wines.

The proposed railway rates.

An Act which is interpreted by the Board authorised to deal with it so that a label is at one time liable and another time free from duty, requires either abolition or very considerable modification.

As the whole of the trade may be considered licensed for the sale of methylated spirit we are precluded from taking out a wine licence, consequently the sale of proprietary medicated wines is confined to grocers and wine merchants, to our detriment; besides, the sale is of too limited a character to justify taking out a £2 licence, even if permitted.

The proposed railway rates if adopted will increase the cost of carriage of drugs in most cases threefold.

R. HAYTON DAVIS.

WHAT IS THE USE OF THE PHARMACEUTICAL SOCIETY.

Sir,—The Council of the Pharmaceutical Society is just what the members choose to make it, and if they do not approve of its policy and yet do not elect new representatives to carry out their views, the blame rests upon their own shoulders. At present it is the only Society we have to look to for support. We let the Chemists and Druggists' Association, a very useful one, fall through want of support, and it seems to me we are inclined to do the same with the Society. Why not at the next election of Councillors pick out such men that will really interest themselves in the welfare of the trade. We have two or three there who are willing, but are not supported by the others. We want more of the stamp of Dr. Symes and Mr. Gwilym Evans, and then I feel sure the burning question of the day, the Inland Revenue interference, would be settled. But so long as we are content to remain inactive we must take the blame upon our own shoulders. Possibly this may stimulate the present Council to move a little.

Cardiff. J. MUNDAY.

POTASSIUM CHLORATE AND CHLORINE VAPOURS.

Sir,—I read with great interest Mr. L. W. Hawkins's paper on the above subject. He is to be congratulated on putting forward the most feasible solution of a difficulty which has puzzled a great many. I have myself been very suspicious of the carbon dioxide explanation, having noticed that under the same conditions "Lamplough's saline" has exploded, whilst others have remained intact. Complaints from customers have also reached me about "home-made salines" made with chlorate giving off a "peculiar odour," which I now suppose due to a trace of chlorine vapours.

Having proved beyond a doubt the chemical action between acid tartaric and potassium chlorate, Mr. Hawkins is quite justified in applying the reaction to "Lamplough's saline;" but it would be much more satisfactory if he had obtained the vapours from the "saline" itself.

I, for one, hope that he will not be satisfied with his results, but will carry his experiments to a more definite issue.

Any chemist who makes a saline containing chlorate might also make observations during the hot weather as to whether a "saline" so prepared and under such conditions, evolves a trace or more of chlorine vapours.

Having arrived at the cause, the next thing is to devise a remedy. Mr. Hawkins has shown that perfect dryness prevents the reaction. This means may be made use of on the small scale, but I am afraid it would not be an easy matter for Messrs. Lamplough, who must use enormous quantities of ingredients, to reduce their moisture to less than ·2 per cent, which amount Mr. Hawkins states to be sufficient for the reaction. To omit the chlorate would of course end the trouble, but Messrs. Lamplough could not do this, considering the reputation their preparation has obtained. Would it not be possible to first mix the 2 per cent. of chlorate with some inert ingredient, so as to coat each particle as it were, and so prevent the acid from affecting it? AN INTERESTED PARTY.

SYRUPUS FERRI ET QUININÆ HYDROBROMATUM, B.P.C.

Sir,—Mr. Martindale in your issue of Saturday asks if anyone besides Mr. Cripps has noticed that the quinine salt crystallizes out of syrupus ferri et quininæ hydrobromatum, B.P.C.

On October 2 of last year I had some of the syrup prepared, but as some trouble had been experienced in getting the quinine salt dissolved in the acid and water, I suggested that another quantity should be made, omitting the acid, and substituting an equal bulk of water. The acid hydrobromate, as anticipated, now dissolved without difficulty. Both syrups on examination to-day (April 1) are entirely free from any crystalline deposit. That prepared strictly according to the B.P.C. has a very minute amorphous deposit, so trifling, however, as when diffused by agitation not to impair the transparency of the syrup. The other is entirely free from deposit of any kind.

It is difficult to conceive why the Committee order acid in this formula. In the corresponding strychnine syrup the need of acid is of course obvious.

7 and 9, Corn Market, Belfast. THOMAS GREEN.

Sir,—I have pleasure in confirming the results of Mr. Martindale on the above subject.

A sample which I prepared about two months ago shows no crystallization whatever.

I have found commercial samples of acid hydrobromate of quinine to vary considerably in point of solubility, the neutral hydrobromate being much less soluble than the acid hydrobromate. The crystals reported by Mr. R. D. Cripps may thus be accounted for.

Foxton Terrace, Richmond. GEORGE MELVIN.

CHLORODYNE.

Sir,—Mr. Martindale is both right and wrong in regard to my remarks on chlorodyne. He is wrong in saying that "there has never been such a statement as 'tinct. chlorof. et morphinæ, the equivalent of chlorodyne,' made in any edition of the 'Extra Pharmacopœia.'" In the one I have (4th edition) the above sentence will be found on page 23, in a review of the British Pharmacopœia, 1885. He is right in his other remarks, for following this statement of equivalence, the attention of the reader is directed to a subsequent page on which the inequivalence is recorded. My paper was only written to reopen a discussion on "Dispensing Difficulties," and as you omitted the discussion in your report, the most valuable portion of the evening's meeting was lost to your readers, and an erroneous impression given, which I am glad Mr. Martindale has removed.

Birmingham. F. H. PROSSER.

*** [The report printed came from the reporter employed by the Midland Association and, as received, did not include the discussion referred to.—ED. PH. J.].

J. Leland.—A candidate for the Minor Examination must have attained the full age of twenty-one years, and must have passed the Preliminary Examination. The candidate must also produce a certified declaration that for three years he has been registered and employed as an apprentice or student, or has otherwise for three years been practically engaged in the translation and dispensing of prescriptions.

Botanist.—The Herbarium Prize is offered annually for the best herbarium collection in any part of the United Kingdom between the first day of January in one year and the first day of July in the year following by an Apprentice or Student of the Society under twenty-one years of age.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Thursfield, Parry, Robinson, Johnston, Bennett.

THE "IODINE ABSORPTION" EQUIVALENT OF ESSENTIAL OILS.*

BY R. H. DAVIES, F.I.C., F.C.S.,
Chemist to the Society of Apothecaries.

Some months ago, when estimating a sample of reduced iron by means of iodine solution, I observed that the indiarubber stopper of the bottle in which the digestion was taking place had apparently become altered; and a further experiment on a weighed portion of pure unvulcanised rubber conclusively showed that under these circumstances the rubber absorbed iodine.

About the same time I found that some eucalyptus oil to which aqueous solution of iodine in potassium iodide was added deprived the latter of its iodine, becoming at the same time so much heavier that after repeating the treatment a few times the oil sank to the bottom of the aqueous liquid. These observations induced me to look into such literature as I could find bearing on the subject of iodine absorption by hydrocarbon and essential oils, and this appeared to be somewhat meagre, consisting mainly of the statement that many essential oils reacted violently with solid iodine, and a suggestion in Watts' 'Dictionary of Chemistry,' vol. iv., p. 190, that since aromatised waters decolorized solution of iodine by virtue of the essential oils dissolved in them, it should be possible to utilise the reaction as a means of estimating the strength of such waters.

No experiments were recorded as to the amount of iodine which given weights of various oils would absorb under these conditions, and up to the present time, so far as I am aware, the necessary data for making this a practical analytical process have not been given.

Having had frequent occasion lately to make use of the process devised by von Hübl for estimating the iodine absorption power of fixed oils, it naturally occurred to me that this useful analytical method would yield results of value when applied to essential oils, and I propose to bring some of the results I obtained before the members of the Society this evening in the hope that they may prove interesting.

Von Hübl's method of working is the following:—25 grams of iodine and 30 grams of mercuric chloride are dissolved in absolute alcohol, and the solution made up to 1 litre. Twenty c.c. of this solution are then added to a known weight (0·4 gram) of the oil to be examined, which has been dissolved in 10 c.c. of chloroform, and the mixture is allowed to stand some hours, after which it is diluted with 15 c.c. of a 10 per cent. solution of potassium iodide, then with 150 c.c. of water, and the iodine remaining in the free condition is estimated by titration with standard sodium hyposulphite solution. As the strength of the alcoholic solution varies somewhat with its age it is necessary to perform a blank experiment with each determination of one, or of a series of samples of oil, and from the difference between the amount of hypo solution required for the blank experiment (when no oil is present) and that required for the liquids containing oil, but otherwise exactly similar to the blank experiment, the amount of iodine that has gone from the free to the combined condition through the agency of the oil can easily be calculated.

This amount is usually expressed as proportional to 100 parts by weight of oil, and constitutes the "iodine absorption equivalent" of the oil. It is not to be assumed that the number represents the amount of iodine actually absorbed by the oil, since, without doubt, the process is usually, if not invariably, a substitution process, in which, for each iodine atom entering into the composition of the oil a second combines with the hydrogen thus displaced, and this ultimately forms the familiar mercuric iodide, which can be obtained in crystals upon evaporation of the aqueous liquid.

At the time I commenced this work, and indeed, for some time later, I was not aware that the application of this process to essential oils had been attempted, but Mr. A. H. Allen, F.I.C., whom I consulted on this point, eventually forwarded a reference which, when followed up, showed that in 1886 Mr. C. Barenthin, a pharmacist of Berlin, had applied the process to some eighteen essential oils, and had published his results in the *Archiv der Pharmacie* for October of that year.

Some preliminary experiments showed at once that there was a very great difference in the amount of absorption of iodine by different essential oils.

In order to get some idea as to whether much or little iodine would be taken up, 2 drops of essential oil were dissolved in about 5 c.c. chloroform in a small flask, and the "Hübl reagent" added, noting the volume required before the decolorization began to become slow.

This preliminary examination enabled me to divide the oils roughly into four classes, according to their reaction with the Hübl reagent.

In the first class the absorption was very little or none, under 1 c.c. of iodine solution being required. This comprised essential oil of almonds, natural and artificial, oils of cassia, chamomile, cinnamon, cummin, cloves, pimento, mustard, American peppermint, Japanese mint, and gaultheria.

In the second class, comprising English dill and caraway oils, the reaction was slow in starting, but afterwards considerable.

In the third class the absorption was to a moderate extent only; not more than 2 c.c. was required, though reaction commenced at the first addition. This class comprised oils of calamus, eucalyptus, fir wool, pennyroyal, sassafras, sandal wood, spearmint.

In the fourth class the decolorization of iodine solution was rapid and abundant, 3 to 6 c.c. of reagent being required. This class contained oils of English aniseed, star-anise, bergamot, copaiba, cubeb, fennel, juniper, lavender, English, foreign and "spike," lemon, origanum, rosemary, rue, nutmeg, turpentine and terebene.

The estimation of the amount of "absorption" was then proceeded with, a weighed quantity of the oil being allowed to stand in contact with an excess of the iodine solution during one night. It was soon found that the differences in absorption power were very much greater in the case of essential than in that of fixed oils. In the latter the lowest recorded is about 9 per cent., and the highest about 160 per cent.; but amongst volatile oils, whilst some do not absorb any appreciable amount of iodine,

* Read before the Pharmaceutical Society of Great Britain, at an Evening Meeting in London, Wednesday, April 10.

others will remove from solution four times their weight, or 400 per cent.

On this account the uniform quantity of oil, 0·4 gram, always taken when fixed oils are operated upon, is not applicable. A very much smaller quantity must be taken of certain oils, *e.g.*, those of the fourth class above, or a much larger quantity of the reagent than the prescribed 20 c.c., which is not so convenient.

The estimations that have so far been made are shown in the table on the opposite page.

In some cases (following Barenthin) I have used a solution of double the strength in iodine and mercuric chloride given above; it is possible by this means to work with a larger quantity of oil; the results do not materially differ. In this case a correspondingly greater quantity of the potassium iodide must be employed in the final operation. The alcohol I have used was the strongest commercial spirit of wine, containing usually 93 per cent. alcohol by weight (*i.e.*, 67 O.P.), having ascertained experimentally that this strength answered as well as absolute alcohol and gave similar results.

It is desirable to make two blank experiments and take the mean, rather than depend upon one, when taking the absorptions of a series of oils.

As an example, the numbers obtained in working one of these will perhaps not be out of place. Taking sample 28:—

Oil of lavender, French grown.

Amount taken, 0·1277 gram.

Hyposulphite solution required 41·75 c.c.

Strength of hyposulphite solution, 100 c.c. = 1·3034 iodine.

Blank experiment (1), 20 c.c. "Hübl" (double strength) required 70·55 c.c. hypo.

Blank experiment (2), 20 c.c. "Hübl" (double strength) required 70·65 c.c. hypo.

Mean of the two blank experiments, 70·6 c.c.

70·6 − 41·75 = 28·85 c.c., the equivalent of "absorbed" iodine;

$$\text{then } \frac{1{\cdot}3034 \times 28{\cdot}85 \times 100}{100 \times {\cdot}1277} = 294{\cdot}46$$

As examples of the agreement between determinations of the same oil I give the amounts of oil used, and the absorption equivalent found, in the individual instances of half a dozen oils for which mean results are given in the table.

Sample.			Absorption. Per cent.	Mean.
3.	Aniseed oil .	(*a*) ·0556	188·3	
		(*b*) ·0573	189·2	
		(*c*) ·1536	191·8	189·7
4.	Bergamot . .	(*a*) ·0475	274·9	
		(*b*) ·0489	277·4	276·1
5.	Chamomile .	(*a*) ·1014	68·18	
		(*b*) ·0947	68·04	68·1
6.	„	(*a*) ·0957	71·8	
		(*b*) ·0960	72·4	72·1
7.	„	(*a*) ·216	66·5	
		(*b*) ·1415	64·5	65·5
8.	Caraway . .	(*a*) ·0443	254·2	
		(*b*) ·0433	255·6	254·9

I venture to direct attention to some points which appear to have interest, and to draw such conclusions as the work so far done seems to me to warrant.

I may say that I feel the utmost confidence in the genuineness of those oils indicated as obtained from the English distiller. In almost all cases the manufacturer has placed these at my disposal specially for purpose of examination, and the agreement between these oils is closer than I should have expected from a consideration of the complex nature of essential oils generally. The samples of oil of chamomile, clove, cubebs, peppermint and sandal-wood well illustrate this agreement.

Oil of cloves (and pimento) I placed in the first class in the preliminary examination as absorbing but little iodine, and was much surprised to find how high the equivalent was.

It appears as if the reaction goes on much more slowly than is usual. In another respect these oils were peculiar. After titrating with the hyposulphite solution the chloroformic solution of oil is usually colourless, and remains so. In the case of these oils, however, it had a deep orange red colour. The cause of this has not yet been ascertained.

Two results of examination of the lavender oil are interesting:—

1. The absorption equivalent of the Mitcham oil from the English variety of *Lavandula vera* is practically identical with that of the oil from the French variety, though the grower informs me that in colour and habit the plants differ much from one another.

2. It is noteworthy that the number obtained in a 50 per cent. mixture of French and English lavender oil is very close to the mean of the equivalents of the component oils (actually found 286·2, theory for equal parts 284·7).

The results of the lemon oil examination are suggestive. It is commonly stated that in spite of the assurances of the makers this oil as found in commerce is habitually adulterated with a prepared turpentine.

The absorption equivalent of lemon oil is high, but not so high as that of turpentine; and it is a fact that the lowest equivalent in these seven samples (328·3) is that of an oil that was specially obtained for me three or four years ago by the agent in London of some manufacturers, for purposes of examination. The other samples (which were offered commercially) are all distinctly higher, ranging from 340·3 to 355·1.

The oils of peppermint and of Japan field mint resemble one another somewhat closely in their equivalents, being about 50 per cent. One sample of American peppermint, said to have been prepared from plants procured from Mitcham and cultivated in America, has a much lower iodine absorption equivalent (82) than either of the other three examined, which range from 121·8 to 143·9. Why the American oil equivalent should be more than twice as high as the English I am quite unable to say.

In the preliminary examination of the oils of peppermint I sometimes found that after standing, the chloroform having in part evaporated, a very permanent green solution was obtained, which had a marked red fluorescence, and also that certain samples of English oil, and all the samples of American oil in my possession, gave a magnificent violet colour when the Hübl reagent was carefully added to their chloroformic solution.

This colour changes gradually through blue into the green first observed, which it becomes after three or four days. The red fluorescence is well marked. The fact that somewhat similar colours

	Name of oil.	Whence obtained.	Iodine absorption per cent.	Estimations made.
1	Oil of almonds, essential	English distiller	No absorp.	Mean of 2 results.
2	,, ,, prussic acid removed	,,	,,	,, 2 ,,
3	,, aniseed, Russian, 1888	,,	189·7	,, 3 ,,
4	,, bergamot, 1888	Purchased	276·1	,, 2 ,,
5	,, chamomile, 1887	English distiller	68·1	,, 2 ,,
6	,, ,, 1888	,,	72·1	,, 2 ,,
7	,, ,, 1886 or earlier	Purchased	65·5	,, 2 ,,
8	,, caraway, English	English distiller	254·9	,, 2 ,,
9	,, cassia	Purchased	159·5	,, 2 ,,
10	,, celery	English distiller	311·6	,, 3 ,,
11	,, cinnamon	Purchased	189·5	,, 2 ,,
12	,, clove (*a*) 1887	English distiller	362·5	,, 2 ,,
13	,, ,, (*b*) half from clove stems, 1885	,,	366·6	One result.
14	,, ,, (*c*), 1885	,,	355·1	,,
15	,, ,, (*d*) 1889	,,	349·5	Mean of 3 results.
16	,, cubebs (*a*), 1888	,,	226·8	One result.
17	,, ,, (*b*), 1885	,,	223·1	,,
18	,, ,, (*c*), 1889	,,	226·0	Mean of 6 results.
19	,, cardamoms ,,	,,	139·3	,, 3 ,,
20	,, cummin, 1877 or earlier	Unknown	81·6	,, 2 ,,
21	,, dill, 1888	English distiller	257·1	,, 5 ,,
22	,, fennel, 1877 or earlier	Unknown	158·3	One result.
23	,, juniper, 1889	English distiller	337·3	Mean of 3 results.
24	,, ,, foreign	Purchased	363·9	,, 2 ,,
25	,, lavender, English, 1886	Distiller	265·5	One result.
26	,, ,, Mitcham, 1888	,,	274·9	,,
27	,, ,, (Mitcham grown) French variety	,,	273·9	,,
28	Oil of lavender (French grown)	Purchased	294·5	,,
29	,, ,, French (best)	,,	262·7	,,
30	,, ,, mixed equal parts, French and English		286·2	,,
31	Oil of lemon, special from agent (*a*)		328·3	,,
32	,, ,, (*b*), 1883	Purchased	340·3	,,
33	,, ,, (*c*), 1888		345·3	,,
34	,, ,, (*d*), ,,	Sample submitted	348·9	,,
35	,, ,, (*e*), ,,	,,	348·0	,,
36	,, ,, (*f*) ,,	,,	345·6	,,
37	,, ,, (*g*), ,,	,,	355·1	,,
38	,, nutmeg, English, 1889	English distiller	308·3	Mean of 3 results.
39	,, ,, foreign, 1888	Purchased	321·5	,, 2 ,,
40	,, parsley, English, 1889	Distiller	255·0	,, 3 ,,
41	,, peach kernel, English	,,	No absorp.	
42	,, pennyroyal, foreign, 1887	Purchased	188·9	,, 2 ,,
43	,, peppermint, English (*a*), 1887	Distiller	51·2	,, 2 ,,
44	,, ,, ,, (*b*), 1887	,,	49·6	,, 2 ,,
45	,, ,, ,, (*c*), 1888	,,	57·7	,, 2 ,,
46	,, ,, American (*a*), 1887	Purchased	132·2	,, 2 ,,
47	,, ,, ,, (*b*), 1888	Sample from importer	143·9	,, 2 ,,
48	,, ,, ,, (*c*), 1888	,,	121·8	,, 2 ,,
49	,, ,, ,, Mitch. (*d*), 1888	,,	81·9	,, 2 ,,
50	,, ,, Japanese (*a*), 1887	Purchased	48·1	,, 2 ,,
51	,, ,, Japanese (*b*) (English grown), 1888	From distiller	43·5	One result.
52	Oil of rosemary, foreign, 1887	Purchased	325·0	Mean of 2 results.
53	,, sandal wood, English (*a*), 1888	From distiller	226·6	,, 2 ,,
54	,, ,, ,, ,, (*b*), 1888	,,	233·9	,, 3 ,,
55	,, savin, foreign, 1881	Purchased	279·5	,, 2 ,,
56	,, turpentine	,,	377·0	,, 12 ,,
57	,, spearmint, English	,,	207·3	,, 2 ,,
58	,, calamus, 1888	,,	181·4	,, 2 ,,

In addition to these oils, the following solid derivatives of essential oils have been examined:—

59	Anethol from English oil of aniseed, old	Prepared	177·4	One result.
60	,, ,, ,, ,, new	,,	182·9	,,
61	,, ,, ,, star-anise oil	,,	177·8	,,
62	Camphor	Purchased	0·46	Mean of 2 results.
63	Menthol	Prepared	0·12	,, 2 ,,
64	Thymol	Purchased	171·5	,, 2 ,,

are produced by agency of nitric acid on peppermint oil is, of course, familiar, having been pointed out by Professor Flückiger in 1871 (*Pharm. Journ.*, [3], i., p. 682). From such experiments as I have been able to make I conclude that the colour reactions produced by the iodine solution are very much finer, and are effected much more rapidly than those produced by nitric acid. The Japanese oils do not give any violet or blue. Before leaving these oils, I think it right to give the numbers assigned to such of them as were examined by Mr. Barenthin. Turpentine, 300; clove, 270; caraway, 265; bergamot, 260; juniper, 245; rosemary, 185; anise, 164; lavender, 170; calamus, 155; fennel, 140; cinnamon, 100 (*Archiv der Pharmacie*, Oct., 1886).

The solid substances examined were four. Three samples of anethol, one of camphor, menthol and thymol. In these cases, since the substances were regarded as of known chemical composition, and not mixtures, as the oils very generally are, I thought it probable that if any absorption took place it would be in some proportion bearing a definite relation to the molecular composition. The absorption in the cases of camphor and menthol was so small as to suggest the presence of traces of oil, and that the pure substances would not absorb odine at all. In the case of thymol there was decided absorption, amounting to 171·5 per cent. of the thymol taken. Now the formula of thymol being $C_{10}H_{14}O$, if two atoms of iodine entered into reaction with one molecule, the percentage absorption would be 169·3, which is very close to that actually found. One cannot speak with certainty until the product has been isolated and examined, but it is probable that mon-iodo thymol results from this reaction.

The anethol was simply separated by cold and dried between bibulous paper. Doubtless there is some adherent oil, which could be separated by crystallisation from alcohol. When recrystallised this will be subjected to a further examination. The only conclusion I can at present draw from the very similar absorption equivalents is that the composition of this substance is the same, whether prepared from star-anise oil or that of the true aniseed.

I have not yet been able to try how far this iodine absorption process would serve as a means of estimating the amount of oil in aromatised waters. It seems feasible to shake up a known amount of the water with a little chloroform, and to digest the chloroformic solution with the Hübl reagent, but at present, so far as I know, it has not been tried for this purpose.

In conclusion, I regret that this account is so much less complete than I had hoped to make it. The facts that the subject is of some interest to members of this Society, and that the present is the last meeting for this session, will, I trust, serve to excuse my presenting it in this incomplete form.

My thanks are due in particular to Messrs. Stafford, Allen and Sons, for the very fine series of oils they have furnished me with; also to Messrs. Geo. Atkinson and Sons, J. and R. V. Matthew, of Croydon, Messrs. Stevenson and Howell, Mr. Samuel Lambert, Mr. J. Moss, Mr. R. Morrison, and to Mr. Thomas Hunter for his able assistance in this investigation.

[*The discussion on this paper is printed at p.* 827.]

NEVADA'S NATURAL SOAP.*

In Nevada are several deposits of mineral soap. One of these has been worked for three or four years. The soap is sometimes made up into cakes as it comes from the mines, but usually it is toned down by admixture with various other soaps. In Dakota and Wyoming are also deposits of natural soap. In regions where soda, borax and mineral oils abound it is only necessary to bring these ingredients together and a soap mine is the result. Hot springs assist very materially in uniting and concentrating the materials provided by nature. The soap found about hot springs is therefore generally harder and more perfect than that produced in the dry lakes. The waters of Owens and Mono lakes are so thoroughly saturated with borax and soda in solution that the addition of any oleaginous matter produces soap. The waters of Mono lake produce myriads of grubs (which after a time become flies) which are washed ashore, and in some places cover beaches a foot or two in depth. The oily matter contained in the grubs or flies, uniting with the alkali in the water of the lake, forms a deposit of soap an inch or two in thickness each year. Thus, in the course of ages, a deposit of natural soap of great depth has built up on the east side of the alkali lakes where the worms are stranded—the prevailing winds being from the west. These peculiar grubs are the only living things found in the waters of Mono and Owens lakes. At certain seasons an insectivorous duck, called the spoon-bill, frequents these lakes, and, feeding upon the aquatic flies and grubs, become so fat that they can hardly fly. Hunters kill these spoon-bill ducks for their oil, as the grubs on which they feed impart to them a fishy taste so strong that they cannot be eaten, except by Indians, who eat both worms and ducks. Ducks killed by hunters and lost are sometimes found in waters of the lake. All the feathers are eaten off the fowls by the alkaline solution, and the layer of fat beneath the skin (an inch in thickness) is found to be changed to soap, hard as the best castile and beautifully white.

OIL OF BAY LEAVES.

Sig. G. A. Barbaglia contributes to the *Atti della Societa Toscana di Scienze Naturali* the results of some researches on the nature and composition of the essential oil obtained from the leaves of *Laurus nobilis*, of which he states very little is at present known, although Blas and Gladstone have studied the oil obtained from the berries, and Stillmann that from the leaves of an allied species, *Laurus californica*, from California.

The greater part of the volatile oil distils off at a temperature between 170° and 175° C. The liquid distilled at 170° is colourless and very mobile, with an agreeable aromatic odour recalling that of oil of peppermint, is insoluble in water, stable in the air, turning slightly and slowly yellow when exposed to light. Analysis gives the chemical formula $C_{14}H_{24}O$. This may either be a camphor belonging to the series $C_nH_{2n-4}O$, or it may be a mixture of two different substances; and the author proposes further experiments, especially the production of the chlorine and bromine derivatives, in order to determine this point.

The oil becomes solid at a temperature of 18°. Attempts to determine the density of the vapour by the apparatus of Hofmann and that of Meyer, varied between 4·498 and 5·377; while the theoretical vapour-density, if the above formula were that of a single substance, would be 7·204. It is possible that during distillation a partial decomposition of the oil takes place into a hydrocarbon and water, $C_{14}H_{24}O = C_{14}H_{22} + H_2O$. Further investigation of this interesting substance is promised.

* From the *San Francisco Chronicle*. Reprinted from the *American Druggist*, March.

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MICHEL EUGÈNE CHEVREUL.

THE death on Tuesday morning last of MICHEL EUGÈNE CHEVREUL has broken one of the longest of existing links between the men of to-day and those of the past, and has removed one who may be said to have stood by the cradle of modern chemistry. Born in the year 1786, at Angers, where his father was a medical practitioner of fair reputation, just at the time when the seething cauldron of national discontent was ready to teem over and sweep France with revolution, he was three years old when LAVOISIER, in his *Traité Elémentaire de Chimie*, gave the death-blow to the phlogiston theory and confirmed the position of the "general acidifying principle" which he had only eight years previously designated by the name "oxygen." At the age of seventeen CHEVREUL went to Paris, where he became associated with VAUQUELIN, whom he succeeded as Professor of Practical Chemistry at the Jardin des Plants in 1810, and in 1813 he received the appointment to the chemical chair at the Lycée Charlemagne. But the post with which his name will be most closely associated was that of Superintendent of the Dye-works and Lecturer on Chemistry at the celebrated Gobelins Factory. This appointment, which he received in 1824, he held for no less than sixty years and when, in 1884, he was finally retired, at the age of ninety-eight, upon a full pension, he is said to have resented the step as premature. In 1826 CHEVREUL was elected a member of the Academy of Sciences in succession to PROUST, and he survived to become *doyen* of this learned body, and to receive from it special compliments upon the completion of his fiftieth and of his sixtieth years of membership. The completion of his centenary, in August, 1886, was celebrated by several ceremonies, one of the most interesting being the presentation of a medal on behalf of the younger race of scientific investigators from "la jeunesse frangaise au doyen des étudiants." CHEVREUL was also President of the National Agricultural Society of France for nearly forty years, and a Director of the Museum of Natural History, besides which he held the Grand Cross of the Legion of Honour. In 1852, in recognition of his services to applied science, he was awarded the Argenteuil prize of 12,000 francs, and on the occasion of its presentation DUMAS testified that the value of the services rendered to the world in the discoveries of CHEVREUL would require to be calculated in hundreds of millions. From other countries than his own CHEVREUL also received many honours. In Great Britain the Royal Society and the Chemical Society have long included him among their honorary members, and in 1873 he received the Albert Medal from the Society of Arts.

As to the labours that thus received public recognition, these may be designated as multitudinous and multifarious, the topics being most diverse and the memoirs in which they have found record numbering nearly five hundred. The first of these papers bears date 1806, and has for its subject the results of a chemical examination of fossil bones, the second described the action of nitric acid on cork, and the third dealt with the chemistry of indigo. The first of his classical papers on fats, upon which the present soap and candle industries are to a great extent based, was published in 1813, and was entitled "Chemical Researches upon Several Fatty Substances, and particularly their Combinations with Alkalies." After his appointment to the Gobelins Works his researches naturally took the direction of dyeing pigments and colours, but his sympathies still remained sufficiently wide to include divining rods and turning tables.

THE MEDICINE STAMP ACTS.

WE much regret that in the endeavour to correct the misapprehensions under which Mr. PROCTOR was labouring in regard to the Medicine Stamp Duty, and at the same time to furnish information on that subject, we appear to have brought down upon us that gentleman's wrath, and though Mr. PROCTOR seems disposed to regard editorial wisdom as suppositious, we will not join issue with him in a contentious spirit, but merely state, in reply to his question, that the authority at the back of the article of last week is the Act 44, George 3, c. 98, together with the very useful exposition of that Act published by Mr. ALPE. The further information required as to the letter of the law would be more appropriately sought from the administrators of the Act or from a judicial authority. It may, however, be remarked that Mr. PROCTOR'S letter in the present number of the Journal shows that he still fails to appreciate the circumstance that so far as the administration of the law is concerned it does not much matter whether or not a chemist intends to hold out a medicine as a nostrum or proprietary article, if he actually describes or recommends it in the manner specified by the Act as constituting liability to stamp duty. If that be done without payment of stamp duty the Commissioners of Inland

Revenue are thereby entitled to claim the penalty attaching to infringement of the law. Moreover, it must be remembered that even in the case of such preparations as Gregory's powder, which are held to be exempt from stamp duty notwithstanding the use of the possessive case, because their formulæ have been officially made common property by publication in the British Pharmacopœia, liability under the Act would accrue if those preparations were described upon labels as being beneficial for the prevention, cure, or relief of ailments, or if they were recommended by advertisement or handbill for such purposes. In like manner the interpretation put upon the use of the possessive case as being in a general way indicative of proprietary claim, has been frequently confirmed by magisterial decisions, and in some instances the right to use such an indication of proprietorship would be as jealously protected as the use of a trade mark.

Though we deprecate the plea that has been put forward on behalf of the "poor chemist," that for some reason or other he cannot comprehend the Medicine Stamp Act, there is no doubt that some one or other of its provisions are often overlooked, and as a consequence chemists find themselves called upon to pay the penalty of infringement of the law. In many instances that is the result of inadvertence, and to avoid such disagreeable experience we have repeatedly recommended that careful attention should be given to the provisions of the Act, for comprehensive as they are there are means by which the liability to stamp duty may be avoided if it be desirable. But we do not think that is to be effected by assuming a defiant attitude and declaiming against oppressive administration of the Act. The facts of the case rather point in the opposite direction, for, as Mr. Alpe points out, the practice is to allow persons who have unwittingly brought their preparations within the charge of duty to alter their labels, etc., so that they may cease to involve liability. And it must also be remembered that though the Act takes cognizance of "all chemical and official preparations whatsoever" it does so only in respect to the advertisement or recommendation of those preparations for the prevention, cure, or relief of ailments, and as nostrums or specifics. In other words, the Act applies only in so far as medicinal preparations of any kind are made to approximate to quack remedies, and it may be inferred that it was essentially to such articles as these that the Act was intended to apply originally. From a pharmaceutical or medical point of view, therefore, the Medicine Stamp Act may claim some respectful consideration, and though practices may have grown up of late years which give rise to some difficulty, such as the dispensing of proprietary preparations referred to by Mr. Davis in his letter, it would probably be more useful to seek a remedy by submitting to the Commissioners of Inland Revenue a representation as to the interference with the ordinary course of the chemist's business thus caused. Certainly it appears that in reply to such a representation by the proprietor of an article liable to stamp duty the Commissioners showed a disposition to make allowance for the requirements of the case he put before them, so far as the request went, viz., to be allowed to supply the article "unstamped for use *as an ingredient* in medical prescriptions." Mr. Davis seems to object to such a mode of getting over difficulties arising out of the Medicine Stamp Act, and he asks why chemists should continue to carry on their occupations under the permission of a Board, etc. The answer to this question is simple. So long as the law exists its provisions must be respected, and any disputed points must be settled either by arrangement with its administrators, or by recourse to legal tribunals. As to the repeal of the law we doubt whether that could be effected so readily as is supposed by some, and even if that were to be the case there is much reason to fear that some of the consequences of its repeal would be as detrimental to the interests of pharmacists as the transition from King Log to King Stork. A serious mistake was made some years ago in the reduction of the licence duty for the sale of patent medicines, and there is little doubt that even those who were at the time most eager for the change have since learnt how mischievously it has affected the interests of chemists, and that it would have been wiser to have increased rather than reduced the duty that was then regarded as oppressive. If, therefore, any steps should be taken to effect a repeal of the Medicine Stamp Act, it should only be done as the result of careful consideration and upon the ascertained prospect that the change wonld be beneficial.

It has been definitely arranged that the next Faraday Lecture shall be delivered on Tuesday, June 4, by Professor Mendeleef, in the Theatre of the Royal Institution. On the following evening the Fellows of the Society will entertain the Professor at a Dinner at the Holborn Restaurant.

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The death is announced in his 77th year, at Bourg-la-Reine (France), on the 25th of March, of M. Claude Adolph Nativelle, the discoverer of crystallized digitalin, for which he was awarded the Orfila Prize in 1871. In Germany also a distinguished pharmacist has passed away in Herr Oscar Schlickum, who was the author of several handbooks on the sciences allied to pharmacy and took a very active interest in the subject of pharmaceutical education.

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At the meeting of the Chemical Society on Thursday next, the 18th inst, there will be read "Notes on Naphthalene Derivatives," by Dr. Armstrong and Messrs. Heller, Howing, Rossiter and Wynne.

Transactions of the Pharmaceutical Society.

EVENING MEETING IN LONDON.

Wednesday, April 10, 1889.

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

The last evening meeting in London of the session was held on Wednesday, the 10th inst. The chair was taken at 8 o'clock by the President, Mr. Michael Carteighe.

A paper was read on—

The Iodine Absorption Equivalent of Essential Oils.

BY R. H. DAVIES, F.I.C., F.C.S.

The paper is printed at p. 821, and gave rise to the following discussion.

The PRESIDENT said this paper was very interesting both chemically and pharmaceutically, and he thought Mr. Davis was very fortunate in the results he had obtained. He was of course aware of the uncertainty which always attended the examination of bodies the precise composition of which had not been definitely determined and their history traced, and until more was known of the actual chemical history of the essential oils, such reagents as had here been applied would probably be of the greatest possible value. He had no doubt that some gentlemen present had made investigations as to the purity of some of the essential oils, and would be able to offer some remarks on the paper.

Mr. BLUNT suggested that this process might be utilised for the purpose of determining the constitution of the essential oils, as Mr. Davies spoke of a definite compound being formed during the operation.

Mr. J. MOSS was inclined to think the paper very interesting commercially, as well as chemically and pharmaceutically. They had lately been reminded that it was necessary to be very careful what they said about essential oils, and that England was not the centre of gravity around which their manufacture turned. But still it must be admitted that London was the centre of the trade in them, and therefore a paper such as this was of the highest importance if they were ever to be able to distinguish between oils which were what they professed to be, and those which professed to be what they were not. An indication in this direction was given by Mr. Davies in what he said about essential oil of lemon, because he showed that this reagent of Hübl acted differently with an absolutely pure specimen, and with those which were not so guaranteed, and which possibly might contain an admixture of something else, it might be turpentine, which happened to have a higher absorbing power than oil of lemon. Another oil which was placed in the third class was the oil of sandal-wood, which was very important both therapeutically and commercially; and there was another oil, that of cedar wood, not at all identical in its therapeutic properties, but physically very much resembling it, though economically of very different importance. If by means of this or any other reagent it became possible to distinguish between sandal wood and cedar wood oil it would be a great help in the determination of the purity of the sandal wood oil imported. The paper was very suggestive, and he trusted Mr. Davies would go on with his experiments.

Mr. HILLS asked whether there was any reason to suppose that time was an important factor in the process—whether a sample of oil would give the same equivalent after being kept a year or two?

Mr. HOLMES was glad to find that Mr. Davies had taken up this subject, for one of the most difficult questions connected with materia medica was that of determining how far an essential oil was pure or adulterated. This process, as far as he could gather, seemed to show that those oils which consisted chiefly of aldehydes and similar bodies absorbed comparatively little iodine, whilst those which contained chiefly terpene absorbed it largely, and one might perhaps draw the conclusion that this test could be better applied to those which were known to contain terpene than to others. He would ask whether it was practicable to distinguish one terpene, such as that in oil of turpentine, from other terpenes which were found in various essential oils; in other words to determine whether turpentine had been added to those oils which naturally contained terpene. Essential oils were far more adulterated in America than in this country, and the oils of camphor and copaiba were largely used for that purpose. The latter contained terpene, and one could understand how, if it were added to the American oil of peppermint, the absorption would be higher than in the English oil. Mr. Moss's suggestion with regard to sandal-wood oil was a very good one, for it was very difficult to decide whether much of that sold was genuine or not. There was a specimen of the oil in the Museum which was actually distilled from sandal-wood in the Fiji Islands, and he should be glad to let Mr. Davies have a portion of it for experiment.

Mr. DAVIES, in reply, said he had not yet been able to do anything in the way of ascertaining the constitution of the essential oils, but he was proposing to do so. It must be understood that what he had brought forward was only a part of a very large subject. It had interested him very much during the past two months, during which he had been making these estimations, and he had from the first intended to apply the process in the direction indicated by Mr. Blunt. His idea was to take a sample of oil which he could rely upon, perhaps turpentine would be a good example, fractionate it very carefully, and as far as possible separate it into its constituents, and ascertain the action of the Hübl reagent on each. But it seemed to him that perhaps the first thing was to make a sort of general scale of the iodine absorption equivalents of the oils, as he found them in pharmacy, or as pure as he could obtain them; that was what he had been and still was doing; but he hoped to be able before long to say something about the constitution of these bodies. He could not add much information with regard to sandal-wood and cedar wood oils, as he had not examined the latter, but he should be very glad to have a portion of the pure sandal-wood oil Mr. Holmes had mentioned. With regard to the question of time, it was two years since Mr. Barenthin experimented, but he himself had not tried the process until lately. The only way to prove whether time had any effect or not would be to operate on the same sample at intervals of two years, or some considerable time. He believed the oil did not materially alter in this respect by being kept in an ordinary way for a length of time and for this reason. Something like three years ago Messrs. Stafford, Allen and Sons, who had on this occasion given him a very good collection of essential oils, gave him certain small samples too small for his then purpose of examining them with the polariscope, and these had remained in his laboratory ever since. He had thus had an opportunity of comparing oil made by that firm in 1885 with that made in 1889, and the results were very close indeed. In the case of oil of cubebs sample A, made in 1888, gave the figure 226·8, whilst that made in 1885 gave 223·1; and one sent him in February last, 226. In the case of oil of cloves, that of 1887 gave 362·5; second quality (half being made from clove stems), 1885, 366·6, first quality, 1885, 355·1, so that the difference was not very great, and an 1889 sample gave 349·5. Ordinary keeping for three or four years, therefore, did not seem to alter the iodine equivalent.

Mr. MASON said Mr. Davies had called attention to a sample of oil of lemon he had had for three years, which he held to be absolutely pure; and he now stated his opinion that age did not at all interfere with the quality of essential oils when this test was applied. Was that so?

Mr. DAVIES said that was the opinion he arrived at, that an essential oil which had a certain iodine equivalent in 1885 would have the same equivalent in 1889.

The PRESIDENT in proposing a vote of thanks to Mr. Davies said it would be very difficult for anyone in one series of experiments, whether he were a chemist or a pharmacist, or both, as in the present case, to work out a paper of this sort, which was largely chemical, in such a way as to quite satisfy acute business men that the process was one which would pay. The last question was essentially directed to that point, how far this process would pay from a commercial point of view? and he hoped Mr. Davies' answer would not be taken to mean more than he intended, and to represent his opinion that old oil of lemon was as good as new, because he had not said so. This was just the sort of work which should be encouraged, and it was very pleasing to him to see Mr. Davies there that evening, almost twenty years after he had been a Bell scholar, since which he had been demonstrator and prizeman and an officer of the Society. He was now attached to the ancient Society of Apothecaries, and had come back like another distinguished man, Phillips, whom they all revered as an authority on the Pharmacopœia, to give the Pharmaceutical Society the benefit of his researches.

At the invitation of the PRESIDENT,

Mr. GREENHOUGH gave some information in respect to some specimens of aluminium which he had placed on the table. He said the cone of aluminium exhibited contained a little over 96 per cent. of pure metal. It was stated that aluminium could be obtained in the market of 98 to 99 per cent. purity, but practically it was not above 96; there was always something with it, generally silicon and dross. Aluminium was supposed to be the metal of the future, and he hoped it might be so, for it had very valuable properties. When mixed with another metal, it purified itself, and also that into which it was put. The great use of it, so far as he could see, appeared to be for making bronze castings for machinery, for when properly made these lasted longer than any other kind, and it was gradually replacing other alloys used for this purpose. The metal could also be rolled out into very fine sheets, which were as fine as gold leaf and more tenacious; they would almost float in the air. It was also useful in making tubes. Those used for opera glasses were drawn, and however much the price of metal was reduced it would not much affect the price of such things as that, because that depended more on the labour than the metal. Another important use which had lately been discovered was for making aluminium steel, which was mixed with iron for making fine castings. It had this curious property, that when the molten metal was in the pan, before being poured into the mould, it might be allowed to become pasty, and then the addition of a little aluminium steel made the whole mass quite fluid, so that it ran easily into the finest castings. It had the same property when mixed with copper. In making large castings it frequently happened that some defect was found and the whole thing had to be done again, but the addition of aluminium, though it made the casting a little more expensive, gave a security against that risk. In casting large cylinders, such as were used for water pipes, perhaps five feet in diameter, and eight or nine feet long, it was necessary in the ordinary method to allow a large piece for the *head*, which had afterwards to be cut off, but by using a little aluminium steel it was only necessary to let the mould just run over. This was not a small matter, because these pieces could not be utilized where the pipes were cast, but had to be broken up and sent away for an entirely different purpose.

The PRESIDENT in proposing a vote of thanks to Mr. Greenhough, said this metal was of great interest to pharmacists, as it seemed about to be produced on an enormous scale at a moderate cost, and would probably be associated with almost every metal for the daily uses of life. They knew the history of aluminium, and also that of the process for cheapening the production of that most wonderful metal sodium, which was so closely connected with it. In 1815 or 1816 it was thought by chemists that potash and soda were elements, and it remained for Davey by his illustrious experiments to show that metallic sodium might be produced in a tobacco pipe from caustic soda. Practically, therefore, Sir Humphrey Davey was the originator of the aluminium industry, just as Faraday was the father of all the electrical developments of the present day.

Mr. HOLMES drew attenton to the beautiful bell-like sound given by the ingots of aluminium when struck, and asked whether this metal was likely to be used for bell-founding.

Mr. MOSS asked if it would be possible for aluminium to take the place of copper in the making of the pans which were so much used in pharmacy, and whether it possessed any advantages over copper, besides its extreme lightness, which would make its use desirable for such purposes. If it would not bear the pressure which copper would under steam, it perhaps might be possible to coat copper vessels with it, as it would not be so likely to introduce maleficent compounds into the preparations made in contact with it as copper sometimes did.

Mr. GREENHOUGH said he had seen a bell about two feet in diameter made of an alloy of aluminium, which sounded very well indeed, and it was thought that after a time it would be used for this purpose, but it was very difficult to get people to adopt a new thing. With regard to utensils and pans for pharmaceutical purposes on a large scale, the great difficulty at present was the working of the metal; but it would stand much greater heat than copper. He had been trying for some time to see if it could not be adapted for making pans for crystallizing citric acid in, because in some countries people were so fastidious about a minute quantity of lead in citric acid that they would pay considerably more for it if it could be guaranteed free from contamination. There was some difficulty at present in the soldering of the alloy, but he believed it would be got over after a time. The metal would hammer very well.

The PRESIDENT said no doubt there were some conscientious people who preferred to use citric acid perfectly free from the suspicion of any poisonous matter, and to such aluminium vessels would be a great boon.

Mr. HOLMES then drew attention to some specimens of aconite which he had had under his cultivation, and said that at this time of year, when the leaves had attained a certain height, it was much more easy to distinguish the varieties than later on when the plants were coming into flower. The first was a specimen of *A. paniculatum*, the stems of which were quite purplish, and the leaves also had a similar tinge and were much stiffer and less divided than in other species. The second specimen was one of *A. Napellus*, quite free from any tinge of purple, and with leaves bearing a strong resemblance to those of *A. variegatum*. The other two were fairly typical *A. Napellus*; in one there was no purple tinge, but in the other there was, indicating perhaps that it was not quite so pure a form as the third. The *A. variegatum*, which was a typical form,

varied much in habit from the others. The *A. Napellus* that had the leaf very like the *variegatum* was very strong in aconitine, leaving a numbing sensation on the tongue for a couple of hours. It showed how widely two plants of the same species might differ in appearance, although chemically they were very similar. He also drew attention to some slides of aconitine shown by Mr. Richards, who had recently read a paper upon them before the Chemists' Assistants' Association. There were also some specimens of essential oils sent by Messrs. Schimmel, of Leipzig, who brought out from time to time interesting new products of this kind, and were often kind enough to send specimens to the Museum. Some were interesting from their perfume, others only as curiosities. One, the oil of *Meum athamanticum*, was from an umbelliferous plant, and had an odour like lovage, fenugreek, and other plants of that kind, but which was most strongly developed in the slippery elm. There was also a specimen of oil of *Matricaria chamomilla*, remarkable for its beautiful blue colour; it was quite as blue as the concentrated liquor of violets, much deeper than litmus, but it was somewhat evanescent. The oil of Roman chamomile when first distilled often had the same colour, but not to so great a degree. Another essential oil recently made by this firm, was from a lauraceous plant in Java, the *Tetranthera citrata*, which had an odour very like the lemon scented verbena. Three other exhibits were articles which had recently appeared in drug sales in London, one an insoluble gum, apparently cherry tree, from Persia, which swelled up in water, but did not make a mucilage. In Germany, he understood, they had succeeded in making a mucilage, and consequently it was bought up at any price they liked to give for export to that country. Then there was a root from the Congo which was sent over as ginger, though it had no resemblance to it except in form. The odour was more like that of an umbelliferous plant. It contained a large starch grain, but it had not yet been identified. There was a specimen of bark from Brazil which had come over without any definite information as to its use, but it gave on digestion in spirit of wine a distinctly yellow colour. It had very little taste. There were also a few specimens sent from Russia by a gentleman who was studying there, which illustrated some of the things used by the peasants for medicine. One, the *Ledum palustre*, was largely used in Germany for driving away insects; it had a slight aromatic odour, and he believed was used in other countries for the same purpose. There was also a specimen of Daroo wood, sent by Mr. Kemp, of Bombay, where it was used for flavouring rum. Some time ago Mr. Kemp had sent to the Museum a sample of essential oil distilled from this wood which had a peculiar odour of its own.

The PRESIDENT proposed a vote of thanks to Mr. Holmes and to the donors of the specimens. If London was the centre round which everything of value in the shape of drugs and chemicals practically turned he might also say that the Museum of the Pharmaceutical Society was the place where authentic specimens of nearly everything dealt with in commerce and pharmacy, or even to some extent in the arts, might be found. The Society was able to boast of the Museum because of the generosity of gentlemen, like Messrs. Schimmel and others, who were good enough to send specimens, and though there was not always room in it for the large specimens of apparatus or chemicals which some of their friends would like to send, it contained a number of specimens of guaranteed history at least, if not always of guaranteed purity, and if any of the students, when they had passed their examination, wished to investigate any of these authentic specimens Mr. Holmes would be glad to give them an opportunity of doing so, and in the next session the Society would be pleased to hear the results.

FIRST OR PRELIMINARY EXAMINATION.

April 9, 1889.

The following are the questions that were set for the Preliminary examination on the 9th inst.:—

LATIN.

(*Time allowed—from* 11 *a.m. to* 12.30 *p.m.*)

I. (*For all Candidates.*) *Translate into Latin:*—

1. The Romans gave the greatest honours to good citizens.
2. You will be loved by many.
3. Who doubts that Socrates was unjustly punished?
4. Tarquinius Superbus, the seventh king of the Romans, reigned twenty-four years.
5. The war being finished, the chiefs of the states came together.

II. Translate into English either A. (Cæsar) or B. (Virgil).

(*Candidates must not attempt both authors.*)

A. CÆSAR.

1. Relinquebatur una per Sequanos via, qua, Sequanis invitis, propter angustias ire non poterant. His quum sua sponte persuadere non possent, legatos ad Dumnorigem Æduum mittunt, ut eo deprecatore a Sequanis impetrarent. Dumnorix gratia et largitione apud Sequanos plurimum poterat, et Helvetiis erat amicus, quod ex ea civitate Orgetorigis filium in matrimonium duxerat; et, cupiditate regni adductus, novis rebus studebat, et quam plurimas civitates suo sibi beneficio habere obstrictas volebat.

2. Ipse autem Ariovistus tantos sibi spiritus, tantam arrogantiam *sumpserat*, ut ferendus non *videretur*. Quamobrem *placuit* ei, ut ad Ariovistum legatos mitteret, qui ab eo postularent, uti aliquem locum medium utriusque colloquio diceret: *velle* sese de republica et summis utriusque rebus cum eo *agere*. Ei legationi Ariovistus respondit: Si quid ipsi a Cæsare opus esset, sese ad eum *venturum* fuisse; si quid ille se velit, illum ad se venire *oportere*.

Grammatical Questions.—For those only who take Cæsar.

1. Give the nominative and genitive cases, singular and plural. of *sua sponte*, *ea civitate*, *novis rebus*, *plurimas civitates* (Par. 1).
2. Give the principal parts of the verbs in italics (Par. 2).
3. Parse fully the following words:—*angustias*, *possent*, *regni*, *adductus*, *sibi* (Par. 1).
4. What is meant by an *indirect question*? Give examples with verbs both in present and past time.

B. VIRGIL.

1. Id metuens, veterisque memor Saturnia belli,
   Prima quod ad Trojam pro caris gesserat Argis—
   Necdum etiam causæ irarum sævique dolores
   Exciderant animo. Manet alta mente repostum
   Judicium Paridis, spretæque injuria formæ,
   Et genus invisum, et rapti Ganymedis honores.

2. Talibus Ilioneus; cuncti simul ore fremebant
   Dadanidæ.
   Tum breviter Dido, vultum demissa, profatur:
   "*Solvite* corde metum, Teucri, *secludite* curas.
   Res dura et regni novitas me talia *cogunt*
   Moliri, et late fines custode tueri.
   Quis genus Æneadum, quis Trojæ *nesciat* urbem?
   Virtutesque, virosque, et tanti incendia belli?
   Non obtusa adeo *gestamus* pectora Pœni;
   Nec tam aversus equos Tyria Sol jungit ab urbe.

Grammatical Questions.—For those only who take Virgil.

1. Give the nominative and genitive cases, singular and plural, of *alta mente*, *genus invisum*, *rapti Ganymedis* (Par. 1).

2. Give the principal parts of the verbs in italics (Par. 2).

3. Parse fully the following words:—*breviter*, *nesciat*, *obtusa*, *aversus* (Par. 2).

4. What is meant by an *indirect question*? Give examples with verbs in present and past time.

ARITHMETIC.

(*Time allowed—from* 12.30 *p.m. to* 2 *p.m.*)

[The working of these questions, as well as the answers, must be written out in full.]

1. Find the value of 7 chests of tea, each weighing 2 cwt. 1 qr. 13 lb., at £23 4*s*. 4*d*. a cwt.

2. A bankrupt owes to one creditor 500 guineas, to each of two others £250, to each of three others £75. His property is worth £625. How much can he pay in the pound, and how much will the first creditor receive?

3. Add together $\frac{1}{5}$, $\frac{2}{3}$, $\frac{1}{35}$, $\frac{5}{21}$; and find what fraction the sum is of $1\frac{2}{3}$ of $\frac{4}{2\frac{7}{9}}$.

4. Find the value of $2{\cdot}8\dot{6}80\dot{5}$ of 3*s*. + $8{\cdot}\dot{3}$ of 4*s*. − 1·8 of 5*s*.

*5. A boy walks 3 kilom. 654 m. in 42 minutes. Find his average pace per hour, (i.) in French measure, (ii.) in English measure.

*6. If 6 horses in 4 days eat 144 kilog. 96 gr. of hay, how long will 675 kilog. 450 gr. serve 15 horses.

7. In a competitive examination, ·07 of the candidates fail to qualify, $\frac{12}{31}$ of the remainder are unsuccessful, and 114 are elected. How many candidates at first presented themselves?

ENGLISH.

(*Time allowed—from* 3 *p.m. to* 4.30 *p.m.*)

1. Analyse the following:—

"The people like a headlong torrent go,
And every dam they break or overflow;
But, unopposed, they either lose their force,
Or wind in volumes to their former course."

2. Parse fully:—

"To mortal men great loads allotted be;
But of all packs no pack like poverty."

3. Correct the following sentences, giving your reasons:—

(i.) He is not only noted for his singing, but his playing.

(ii.) You are not so tall as your brother.

(iii.) If I had only ran the last few yards instead of walked, I should have caught the train easy enough.

4. In the following passage supply the necessary capital letters, and put in the stops and inverted commas where necessary:—of all that have tried the selfish experiment let one come forth and say he has succeeded he that has made gold his idol has it satisfied him he that has toiled in the fields of ambition has he been repaid he that has ransacked every theatre of sensual enjoyment is he content can any answer in the affirmative not one and when his conscience shall ask him and ask it will where are the hungry whom you gave meat the thirsty whom you gave drink the stranger whom you sheltered the naked whom you clothed the prisoner whom you visited the sick whom you ministered unto how will he feel when he must answer i have done none of these things i thought only for myself.

5. Write a short composition on one of the following subjects:—

(i.) The incidents of a day thoroughly enjoyed.

(ii.) The effects of the invention of steam-engines.

(iii.) Can Persecution be defended?

(iv.) "How oft the sight of means to do ill deeds
Makes ill deeds done!"

* At least one of these two questions must be attempted by every candidate.

SCHOOL OF PHARMACY EXAMINATION QUESTIONS.

The following are the questions that were set for the Prize Examinations at the close of the Winter Course of the Society's School of Pharmacy:—

Notice.—In framing Answers Candidates should not enlarge upon the Questions, but should confine themselves to giving, as briefly and clearly as they can, the information required.

PHARMACY AND PRACTICAL PHARMACY.

MR. INCE.

BRONZE MEDAL.

Thursday, March 28, 1889.—*Time allowed, three hours.*

1. Define Granulation, Porphyrization and Maceration, with typical illustrations.

2. Describe methods which have been adopted for the preservation of infusions.

3. Give in detail the B.P. processes for Extractum Sarsæ Liquidum, Syrupus Ferri Phosphatis, Tinctura Chloroformi et Morphinæ, and Unguentum Glycerini Plumbi Subacetatis.

4. Name reliable methods for dispensing Volatile Oils, Camphor, Pepsin, Chloral Hydrate and phosphorus, prescribed in a pilular form.

5. Classify the Spiritus of the British Pharmacopœia, noting special processes employed.

MATERIA MEDICA.

MR. E. M. HOLMES.

BRONZE MEDAL.

Friday, March 29, 1889—*Hours from* 10 *a.m. till* 1 *p.m.*

1. Enumerate the varieties of linseed ordinarily met with in English commerce, mention any differences that exist between them, the seeds most frequently occurring as adulterations, and the properties of linseed, and of linseed oil, on which its use in pharmacy, etc., depends.

2. State the botanical and commercial sources of oil of anise, and the peculiarities that distinguish the oil.

3. Mention the plants known to yield caffeine, their relative richness in it, and the natural orders to which they belong.

4. From what drug is cantharidin obtained? What is the best method of extracting cantharidin, and what are its chemical and medicinal properties?

5. Describe the varieties of sarsaparilla met with in English commerce.

6. What are the botanical and geographical sources of gum arabic? Describe the physical characters and chemical differences by which the commercial varieties are distinguished.

Practical Work.

Friday, March 29, 1889.—*Hours from* 2 *p.m. to* 5 *p.m.*

1. Name the seeds and fruits in the mixture placed before you, and state the distinctive features by which you recognize them.

2. Distribute the drugs before you under the respective heads of gums, gum-resins, resins and balsams.

3. Ascertain if the specimen of saffron before you is pure, and if not, state the character of the adulterants present.

CHEMISTRY.

PROFESSOR DUNSTAN.

BRONZE MEDAL AND TWO CERTIFICATES OF HONOUR.

Part I.—Physical and Inorganic Chemistry.

Monday, April 1, 1889. *Time allowed*—10 *a.m. to* 1 *p.m.*

1. Explain what is meant by the "boiling point" of a liquid. How is it determined?

2. How would you determine the density of a specimen of common salt?

3. Describe the apparatus you would employ to ascertain the latent heat of steam. Explain how the calculation is made.

4. How is phosphoric acid made on the large scale? Give an account of the different varieties of phosphoric acid.

5. How is the composition of atmospheric air quantitatively determined?

6. State the sources and properties of ammonia. How may the correctness of the formula NH_3 be demonstrated.

Part II.—Inorganic and Organic Chemistry.

Monday, April 1, 1889. *Time allowed*—2 *p.m. to* 5 *p.m.*

1. How is white arsenic prepared? Describe its properties and composition.

2. How is the metal tin obtained from its ore? What are the principal impurities in commercial tin?

3. Compare the properties of mercury and its compounds with those of copper and its compounds.

4. What is the constitution of ordinary alcohol? Show how acetic acid, ethyl acetate and ethylene may be obtained from it.

5. Describe the action of diastase on starch. In what respects does this action differ from that of diluted sulphuric acid?

6. What are the chemical relationships of phenol? Why is "carbolic acid" an incorrect name for this substance?

Botany.

Professor Green.

BRONZE MEDAL AND TWO CERTIFICATES OF HONOUR.

Thursday, April 4, 1889. *Time allowed*—10 *a.m. till* 1 *p.m.*

1. Give an account of the structure of the stem of a fern. Explain the means by which this increases in length, and describe its general appearance and habit of growth.

2. Explain what is meant by the ascent of the sap in a tree. How is it brought about, and of what use is it to the plant? In what tissues does the ascending sap travel?

3. Give an account of the life history of the fungus of ergot (*Claviceps purpurea*).

4. Describe the development of the peculiar bordered pits characteristic of the wood of Pinus.

Thursday, April 4, 1889. *Time allowed*—2 *p.m. to* 5 *p.m.*

1. What is meant by the expression "Alternation of Generations?" In what plants do we find this best seen? Show how we find it represented in flowering plants.

2. Give an account of the occurrence of chlorophyll. What is the structure of a chlorophyll grain? Explain what is the function of chlorophyll, and show what are the conditions under which it exercises it.

3. Describe the development of stomata. Give some account of their function.

4. Show how the growth in thickness of an ordinary root is brought about.

Practical Examination.

Friday, April 5, 1889. *Time allowed*—10 *a.m. till* 1 *p.m.*

1. Make such microscopical examinations as you think necessary to display the structure of the tissue A. Mount your preparations in glycerine, label them, and leave them for the examiner's inspection.

2. Draw the microscopic preparation B. Write under your drawing a brief description of it and name the several parts. Identify the preparation.

3. Identify the microscopic preparations C, D, and E.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday, April 3.

Present—The President, Mr. James E. Brunker, M.A., in the chair; Messrs. Grindley, Wells, Merrin, Baxter, McCormack, Beggs, Hayes, Allen, Hodgson and Simpson.

Before the minutes were signed,

Mr. Grindley begged leave to point out a difference between the minutes and the reports of the proceedings of the last meeting of the Council which appeared in the *Pharmaceutical Journal* and the *Chemist and Druggist*. It would be remembered that he not only spoke against the motion brought forward by Professor Tichborne, but also voted against it; but by some fatality his name was omitted from the reports in the Journals as having voted against it, the numbers being inaccurately stated as 3 for and 8 against, instead of 3 for and 9 against.

The President: I am much obliged to you for calling my attention to the fact. It escaped me when looking over the report.

The Reporter said he inadvertently omitted the name of Mr. Grindley as having voted.

A letter was received from Mr. Joseph C. Irvine, of Castlederg, Tyrone, stating that as he was unable to present the necessary certificate for chemistry he would be unable to present himself at the examination for the License to be held that day. He therefore requested that a fee of £5 5*s.*, which he had lodged in the Bank of Ireland, might be refunded.

Agreed to.

Mr. Allen remarked that candidates ought not to lodge certificates unless they covered the entire time required. It might be well if Mr. Ferrall were instructed not to receive insufficient certificates.

A letter was received from the resident medical superintendent of Ennis District Lunatic Asylum, acknowledging a letter of the Council of March 7, respecting the candidature of Mr. John Gilbert, L.P.S.I., for the office of apothecary in that institution.

Donations were received from the Pharmacy Board of Victoria of a copy of their report for 1888, and from the Pharmacy Board of Queensland of a copy of the Pharmaceutical List for Queensland.

On the motion of Mr. Hayes, seconded by Mr. Allen, thanks were voted to the donors.

A report was read from the Committee appointed last month to consider the question of obtaining new premises for the Society.

The President, in bringing up a report from the Certificates Committee, said it was suggested that in future the Registrar should retain all the certificates in practical pharmacy sent in by the candidates. Questions had arisen in so many case that it was desirable that these certificates should be filed for future reference.

In reference to an account from the Pharmaceutical Society of Great Britain for copies of the *Pharmaceutical Journal* supplied to the members of the Society during the year 1888,

Mr. Hodgson remarked that the Pharmaceutical Society of Great Britain had treated that Society most liberally, but he thought that any person who wanted the Journal should pay for it.

Some further matters having been disposed of, the Council adjourned.

April Examinations.

The following were the successful candidates:—

Preliminary.

Canton, William Francis .....Mullingar.
Carleton, Thomas .....Dublin.

Cleary, Daniel James .....Limerick.
Hogg, George Alexander .....Belfast.
Savage, William John .....Newry.
Thomson, John David .....Dublin.
White, John Joseph .....Skerries.
Whitla, Robert George .....Monaghan.

Eight were rejected.

License.

Connor, John Edgar .....Newry.
D'Arcy, Edward Michael .....Dingle.
Henry, Samuel R. .....Dublin.
McClelland, John .....Dublin.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The third general meeting of the fortieth session was held at the Royal Institution on Thursday evening, March 28, the President, Mr. A. H. Samuel, F.C.S., in the chair.

The minutes of the previous meeting were read and confirmed, and several donations announced.

Dr. Symes exhibited one of Thompson's Excelsior pill coating machines, and remarked that it possessed some advantages over the machine showed by him at the previous meeting.

Mr. Conroy stated that the new regulations of the Board of Trade require pills supplied to any passenger ships to be gelatine-coated, and that the regulations are not restricted to pills supplied to the North Atlantic Steamers, as stated by Mr. A. C. Abraham at the last meeting.

Mr. J. J. B. Woods, of the Stanley Hospital, was elected a member of the Association.

Dr. Symes said he regretted that the discussion of the Pharmacy Act Amendment Bill had been dropped at the last meeting, and he should like to see the matter brought forward again.

Mr. T. F. Abraham said that another question worthy the consideration of the Association was the sale of medicated wines, and it was moved by Mr. J. S. Ward, seconded by Mr. W. Wellings, and resolved, that a meeting be called on Thursday afternoon, April 11, for the consideration of the proposed increase in the railway rates for the carriage of drugs, the sale of medicated wines and the Pharmacy Act Amendment Bill.

A paper was then read on "Turpentine and its Products," by Mr. E. Davies, F.C.S., F.I.C., which will be published in a future number.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

The following is a copy of a letter that has been transmitted to the General Medical Council on behalf of the Midland Counties Chemists' Association:—*

"To the General Council of Medical
"Education and Registration.
"Mason College, Birmingham,
"*April* 9, 1889.

"Gentlemen,—At a recent meeting of this Association, the question was raised by one of its members as to the meaning in prescriptions of the sign 'Oss.' He showed that he had endeavoured to ascertain the opinion of local medical practitioners, and that out of twenty-eight replies to an inquiry, it was found that twelve physicians and surgeons intended *eight* ounces to be dispensed, and sixteen, *ten* ounces. Under these circumstances the Council of this Association considers that the matter should be definitely settled by your honourable Council, and respectfully urges you to take such action as will relieve pharmacists from the serious difficulty under which they are now unavoidably placed.

"I am, Gentlemen, your obedient Servant,
"Geo. E. Perry, *President of the Association*."

* It may be that the publication of this letter will, by calling attention to the subject, tend to produce greater unanimity in the minds of medical men on the subject; but we fail to see what the General Medical Council can do more than it has done, in defining in the Pharmacopœia the sign O as meaning 1 pint or 20 fluid ounces.—Ed. P. J.

Proceedings of Societies in London.

CHEMICAL SOCIETY.

An ordinary meeting of the Chemical Society was held on Thursday, March 21. Mr. W. Crookes, F.R.S., President, in the chair. Some certificates were read for the first time, and the following papers were read:

The Molecular Weights of the Metals. Preliminary Notice. By William Ramsay, Ph.D., F.R.S.—The molecular weights of a number of metals have been determined by Raoult's vapour-pressure method, viz., by ascertaining the depression of the vapour-pressure of the solvent produced by a known weight of dissolved substance. The connection between osmotic pressure and depression of vapour-pressure has been shown by van't Hoff, and in a recent number of the *Zeitschrift für physikalische Chemie* by Arrhenius; the method of the latter is characterized by great simplicity. It has also been mathematically developed by Planck (see also *Zeitschr. f. phys. Chem.*, 1888, 405). The relation between molecular weight and depression is expressed by the equation—

$$W = \frac{W' \times P \times p}{100 \times d},$$

where W is the molecular weight to be found; W′ the molecular weight of the solvent; P/100 the percentage weight of the dissolved substance in solution; p the vapour-pressure of the solution; and d the depression in the vapour-pressure of the solvent produced by adding the substance dissolved. It will be noticed that the relation is independent of temperature. The solvent employed was liquid mercury; the temperatures 260° and 270° for a few substances, and the boiling point of mercury for most. The apparatus, of which a description will appear in the complete paper, is of the simplest description, and lends itself to the determination of molecular weights of all substances soluble in any pure menstruum, no knowledge of the vapour-pressures of the solvent being required. The method is much more generally and easily applicable than the alternative method of Raoult, whereby the molecular weight is deduced from the depression of the melting point of a solvent due to dissolved substance. The results obtained are as follows:—

Element.	Atomic weight.	Molecular weight.		Molecular formula.
		Found.	Calculated	
Lithium . .	7·02	7·00	7·02	Li_1.
Sodium . . .	23·04	12·1	11·52	$Na_{\frac{1}{2}}$.
Potassium . .	39·14	28·57	?	K (?).
Silver . . .	107·93	109·0	107·93	Ag_1.
Gold	197·22	204·3	197·22	Au_1.
Barium . . .	137·0	74·45	68·5	$Ba_{\frac{1}{2}}$.
Magnesium .	24·3	20·33	24·3	Mg_1.
Zinc	65·34	60·85	65·43	Zn_1.
Cadmium . .	112·1	100·0	112·1	Cd_1.
Gallium . .	69·9	68·1	69·9	Ga_1.
Thallium . .	204·2	183·5	204·2	Tl_1 (?)
Tin	119·1	114·9	119·1	Sn_1.
Lead . . .	206·93	204·1	206·9	Pb_1.
Antimony . .	120·2	134·2	120·3	Sb_1.
Bismuth . .	208·1	209·2	208·1	Bi_1.

These numbers represent some of the actual results. Nevertheless, they must not be taken as absolute; although in many cases they are conclusive as to the molecular weight of the metal, still further experiments are needed. As an instance of what occurs, the metals thallium and antimony may be chosen. With thallium, for example, the following results were obtained:—

Percentage of thallium in amalgam. Per cent.	Molecular weight. Found.	Calculated.
0·8191	157·4	204·2
1·666	183·5	204·2
2·894	174·3	204·2
3·290	183·9	204·2

No appreciable change is produced on concentration. But with antimony, the molecular weight increases proportionately to the amount present, thus:—

Percentage of antimony in amalgam. P. c.	Molecular weight. Found.	Calculated
1·117	134·2	120·3
1·526	155·4	120·3 to 240·6
2·257	193·4	120·3 to 240·6
3·289	294·6	240·6 to 481·2 ?

Here an association of atoms is evidently in progress. It may appear startling that the molecular weight of the metals sodium, potassium and barium are given as half their atomic weights. From the formula employed in calculation, it will be seen that this is on the assumption that the molecular formula of mercury is Hg_1. There are strong reasons in favour of this supposition, and the whole question will be discussed in the complete paper. But, at present, it may be taken as the most convenient way of stating results. The author would not wish to commit himself to any positive assertion on the point, except in so far as the accuracy of the experimental data are concerned. The numbers have been amply confirmed by repetition, and must be taken as accurate within from 1 to 5 per cent. of the quantity measured. The author is now occupied in extending these results, and in confirming them by the depression of the melting point method.

The Application of Raoult's Depression of Melting Point Method to Alloys. By C. T. Heycock, M.A., and E. H. Neville, M.A.—The result of Raoult's investigations on the lowering of the freezing points of solutions "that one molecular proportion of any substance dissolved in 100 molecular proportions of any solvent whatever lowers the freezing point of that solvent 0·62° C." has not apparently been tested by the dissolution of metals in metals. The authors therefore present the results of some preliminary experiments on the change in the solidifying point of tin caused by the addition of small quantities of other metals. From repeated experiments, they have confidence that the numbers obtained are approximately correct, though they reserve for a future paper details of the method of experiment and the conclusions which may be drawn from the results. For the present, it is sufficient to state that the dissolution of a metal in tin appears to follow the same laws as that of compounds in other solvents, *i.e.* (1) That the fall in temperature of the solidifying point is directly proportional to the weight of metal added. (2) That the fall of temperature is inversely as the atomic (molecular ?) weight of the metal added. The experiments were conducted by melting a mass of 400 grams of tin, and by means of a mercury thermometer, using a reading telescope, the solidifying point was determined, whilst the mass was kept rapidly stirred. Slight surfusion, usually three or four tenths of a degree, was generally noticed. The tin was then re-melted, and from 1 to 3 grams of metal added, and the solidifying point again determined. In some cases where the metals alloy with difficulty, portions of the 400 grams of tin were withdrawn, and, whilst fused under borax in a gas furnace, known weights of the other metals were added, and then this concentrated alloy was added to the bulk of the tin. Another gram or two of the metal was then added, and the experiments repeated. The average melting point of the tin used was 226·4° C. Working as above described, the authors find that one atomic proportion of each of the following elements dissolved in 100 atomic proportions of tin causes the following falls of temperature:—

Zn	2·53°
Cu	2·47°
Ag	2·67°
Cd	2·16°
Pb	2·22°
Hg	2·3°
Al	1·34°
Sb	2·0° (rise).

The facts that aluminium produces a fall only one-half that of the other elements, and antimony produces a rise, are, they think, of especial importance. They hope shortly to communicate a more complete paper to the Society, and intend using other solvents, such as Na, Cd, Pb, Hg, etc. They also propose to investigate the behaviour of those alloys which appear to be true compounds, and to find out to what extent of concentration the fall of temperature remains proportional to the weight of metal added, etc.

Dr. Armstrong said that notwithstanding the apparent regularity and simplicity of the results, he was not prepared to accept them as in the least degree final. There was not sufficient evidence in his opinion that the effect observed was not in part at least the outcome of a change in the molecular composition of the solvent; this objection had already been formulated by himself as well as by Professor J. J. Thomson and no one had as yet replied to their criticisms (cf. 'Brit. Ass. Report,' 1888; 'Report of Electrolysis Committee'). The question was one of fundamental importance in relation not only to the determination of molecular weights of dissolved substances, but also to the interpretation of the phenomena of electrolysis and chemical change generally. The results obtained by Raoult's methods were, he thought, comparable with those obtained by determining the specific heats of the elements; in the latter case the observations were undoubtedly made with masses of molecules, which probably were of varying degrees of atomic complexity (cf. 'Brit. Ass. Report, 1885,' p. 962), and yet the results were found to be such as to justify conclusions being drawn as to the relative magnitudes of their fundamental constituents—the atoms. In the same way it was possible that the results obtained by Raoult's method by means of observations on the behaviour of molecular complexes might afford the means of deducing the relative magnitudes of the fundamental molecules comprising the complexes, but not of the actual complexes operated with. The formation of compounds which undoubtedly took place in the case of sodium, for example, must influence the results.

Mr. Crompton asked Professor Ramsay whether he had examined solutions of strengths other than those given. He drew attention to Buckmann's recent experiments on the lowering of the freezing point; these show that the true molecular weight was only obtained when solutions were used the concentration of which was allowed to vary only within certain narrow limits; and that if the solutions were too dilute the molecular weight obtained from the lowering of the freezing point was too low, while if the solutions were too concentrated, it was too high. In some cases the variation of the number obtained with the concentration was enormous. The same would probably be the case for the reduction of the vapour-pressure. The results brought forward were undoubtedly of the greatest interest, but he thought that the method had not been so thoroughly investigated

as to give them an absolute value as molecular weight determinations.

Mr. Pickering said that when the freezing points of mixtures of sulphuric acid and water were plotted out in a form which should, according to Raoult, give a straight line, they gave a most irregular figure. Between 0 and 100 per cent. the solidifying point sunk twice below – 40°, and rose twice to + 10°. The extreme end of the figure (for weak solutions) is, no doubt, irregular and curvilinear like the rest of it, and can be called straight only because the irregularity and curvative are lost in the comparative magnitude of the experimental error. It was not fair to consider evidence deduced from such a source in the same light as that deduced from gaseous densities, where any appreciable deviation from straightness is found only at the extreme ends of the figure, and where the deviation is of the same regular character in every case.

Mr. Groves suggested that although compounds of the metals and mercury could be formed, it was possible that these underwent dissociation when dissolved in mercury.

Professor Carey Foster remarked, that in the case of weak solutions the temperature at which ice forms is determined; but in the case of stronger solutions the temperature is often that at which a hydrate forms: this probably was the explanation of the peculiar curve described by Mr. Pickering. Much depended on the definition given of a molecule, whether it is defined as that smallest quantity capable of existence *per se*, or as that quantity which produces a given effect in depressing vapour-pressure, or freezing point, etc. The two magnitudes were not necessarily the same. The relation observed could hardly be accidental; yet he thought that the value obtained might be a quantity connected with the molecular weight, but not necessarily identical therewith.

Mr. Howard said the main question was, did compounds of mercury with the metals exist at the high temperatures at which the observations were made?

Professor Ramsay, in reply, argued that the existence of a compound of the metal with the solvent—in this case mercury—would give an increased molecular weight; and that, although such compounds existed in many cases at low temperatures, yet at the boiling point of mercury they appeared to be decomposed. The compound of copper and mercury, however, was an exception, inasmuch as it was not dissolved to any great extent by boiling mercury. Hence experiments with copper could not be carried out. Substances in dilute solutions must be regarded as in the gaseous state, their molecules being so far distant from each other as not to exert appreciable attraction on each other; and as occupying but a small portion of the space they inhabit. It has long been argued that the molecular complexity of the gases hydrogen, oxygen and nitrogen must be the same, inasmuch as these elements have equal coefficients of expansion within the widest limits of temperature. A similar argument applies to substances in dilute solutions; it is much more probable that they have a simple and similar molecular structure than that the molecules, if complex, dissociate to an equal extent on equal rise of temperature or on equal alteration of concentration. As regards the empirical nature of Raoult's laws, it is paralleled by the empirical nature of Boyle's and Gay-Lussac's laws, that is, such laws are merely approximations to truth and depend on the fact that the molecules are sensibly beyond the sphere of each other's attraction and themselves occupy no appreciable space. Hence their inapplicability at high concentrations. Just as gases deviate at high pressures from the laws of elasticity when definite compounds are formed, as instanced by Mr. Pickering in the case of mixtures of sulphuric acid and water, each such compound acts as a homogeneous substance—as a solvent of definite molecular weight, with a definite melting point, which is lowered by the addition of one or other constituent, as it would be by the addition of a substance different from either constituent, though probably not to a similar extent, owing to further reactions between the solvent and the added constituent, water or sulphuric acid, as the case might be.

Some Compounds of Tribenzylphosphine Oxide. By N. COLLIE, Ph.D., F.R.S.E.

Contributions to our knowledge of the Isothiocyanates. By AUGUSTUS E. DIXON, M.D.

The Constitution of Primuline and Allied Sulphur-compounds. By ARTHUR G. GREEN.

The determination of the constitution of the heteronucleal αβ- and ββ-di-derivatives of Naphthalene. (Second Notice.) By HENRY E. ARMSTRONG and W. P. WYNNE.

Contributions to the knowledge of Critic and Aconitic Acids. By S. SKINNER, B.A., and S. RUHEMANN, Ph.D., M.A.—The authors have studied the action of phosphorous pentachloride on citric acid, following Pebal's directions (*Annalen*, xcviii. 67). They show that the product is a chloromonochloride formed by the displacement of the alcoholic hydroxyl and one of the carboxylic hydroxyls, it being uncertain, however, which of the three latter in citric acid is affected. The chloride is reconverted into citric acid by the action of water; when heated at 125°, it loses hydrogen chloride, yielding a product which water converts into aconite acid; aniline transforms it into aconityl-anilanilide, and it is similarly affected by treatment with orthotoluidine. The anilanilide yields the anil-carboxylic acid and aniline on hydrolysis, and the toluidine-derivative affords the corresponding toluid-carboxylic acid.

THE ANNUAL GENERAL MEETING.

The Annual General Meeting of the Chemical Society was held on March 28, Mr. W. Crookes, F.R.S., President, in the chair.

The President delivered an address, of which the following is an abstract:—

The number of Fellows of the Society is 1650, of whom 36 are honorary foreign members; at the same period last year there were 1571 Fellows, of whom 37 were honorary foreign members. 140 Fellows had been elected during the year, and on the other hand 23 had died. 16 had withdrawn, and 21 had been removed on account of arrears. In the year 1888 there were 75 original papers published in the 'Transactions,' occupying 895 pages, compared with 88 papers of 871 pages in 1887. The abstracts in 1888 occupy 1351 pages, compared with 1159 in 1887. The number of abstracts is 2470 compared with 2277 in 1887. 103 papers have been communicated to the Society this session. The library continues to increase, and every year is becoming richer in rare volumes and books of reference, the expenditure under this head for the current year having been £308 5*s*. 6*d*.

Referring to his remarks of last year relating to the publication of the same paper in several journals, the President pointed out that the Council has resolved that no memoir is to be published which has previously appeared in any foreign journal, unless it is specially recommended by the Publication Committee and approved by the Council. The reasons for this resolution are not hard to seek, the chief being that the reputation of the Society, as the original channel of the researches in question, is imperilled, or at least obscured.

After speaking with approval of the recent protest against examinations, the President drew attention to an evil threatening, if not in actual operation, against which, he thought, timely protest should be raised, viz., the system of "sealed papers." Everyone knows that on the continent, and more especially in France, it is common for someone who has come, as he thinks, near the solution of some important question, to write

out a sketch of his incomplete results, seal it up, and deposit it for safe keeping with the president or secretaries of some learned society. Here it may lie, perhaps for years, until the author requests that it may be opened and read before the society. The original plea for this practice was that the author's priority should be guaranteed against others who might possibly lay claim to his ideas. But priority can be quite as effectually secured by a brief preliminary notice read before some society or sent to some journal, in which the author reserves to himself the further investigation of the subject. Such reservations are invariably respected among men of honour.

Reference was made to Krüss's instructive discovery that nickel and cobalt contain a common hitherto unsuspected constituent; and to the recently published posthumous memoir, in which Wroblewski's observations on the compressibility of hydrogen at temperatures ranging from that at which water boils to that at which oxygen boils (– 182·4°). As Wroblewski comes to the conclusion that the critical temperature of hydrogen is – 240°, and its critical pressure 13·3 atmospheres, it is improbable that either Pictet or Cailletet ever succeeded in liquefying hydrogen.

It was announced that the Council had resolved that in future the balloting for Fellows at the meeting should be conducted by means of papers.

The Rare Earths as Interpreted by the Spectroscope.

The President then proceeded to give an account of the history of the so-called rare earths, as they have been brought to light and distinguished by the aid of the spectroscope, particularly with reference to his own researches. In the following table is given a list of the so-called "rare elements," with which he has been specially occupied during the last seven or eight years. Column 1 gives the names by which they are commonly known. Column 2 gives their atomic weights, etc. Column 3 shows in what manner they come under the domain of spectroscopy; and columns 4 and 5 give the components or meta-elements into which some of these bodies have been decomposed in 1886 by the President, and in 1887 by Krüss and Nilson. A judicial leniency has been exercised in retaining candidates in the first column. Thus, it may be doubted whether decipium, philippium, or gadolinium should have been retained. But when doubts have been cast on the integrity of nearly all the occupants of this column the line cannot be drawn too strictly.

The Didymium Group.—Didymium from samarskite was found by Delafontaine in 1878 to differ somewhat from ordinary didymium extracted from cerite and gadolinite, and he separated from it what he regarded as a new element—decipium; nine months later Lecoq de Boisbaudran announced the discovery of samarium in samarskite, pointing out that its absorption-spectrum was that of decipium, together with two additional bands. In 1885 Carl Auer showed that it was possible to cleave didymium in a certain direction into neodymium and praseodymium. If the spectra of these latter be subtracted from the spectrum of the substance previously regarded as didymium, two bands remain; so that assuming the argument from absorption-spectra to be a legitimate one, it is to be assumed, said the President, that didymium contains yet a third substance: but, he added, didymium had undergone other cleavages in his laboratory. He had not yet decided,

	Atomic weight of metal and formula of oxide.	Gives spectrum by—	Component meta-elements according to— Crookes (1886)	Nilson and Krüss (1887)
Didymium	Neodymium— 140·3, Nd_2O_3. Praseodymium— 143·6, Pr_2O_3. Unnamed.	Absorption.	Dα, λ = 475	Diα, Diβ, Diγ, Diδ, Diε, Diη, Diθ, Diι, Diκ
Decipium				
Samarium	150·12, Sm_2O_3.	Absorption and phosphorescence	Sδ, Gε, Gγ, Gθ	Smα, Smβ
Lanthanum	138, La_2O_3.	Phosphorescence.		
Erbium	166, Er_2O_3.	Absorption and phosphorescence.	λ 550, λ 493	Erα, Erβ
Philippium	45—48, PpO.	Phosphorescence.		
Holmium	—	Absorption.	—	Xα, Xβ, Xγ, Xδ
Thulium	170·7, Tm_2O_3.	Absorption.		Tmα, Tmβ
Dysprosium	—	Absorption.	γ 457—448	Xζ, Xε, Xη
			Lecoq de Boisbaudran.	
Yttrium	88·9, Yt_2O_3.	Phosphorescence.	Gα, Gβ, Gδ, Gζ, Gη	Zα, Tb, Yt
Terbium	124·7, Tb_2O_3.			
Gadolinium (Yα)	—	Phosphorescence.	Gβ, Gζ	
Ytterbium	173·01, Yb_2O_3.	Phosphorescence.		
Scandium	44·03, Sc_2O_3.			

however, whether we shall have to recognize further decomposition of neodymium and praseodymium, or whether the original didymium is capable of being resolved differently, according to the manner in which it is treated. Working on the spectra of didymium from various sources, the conclusion was more and more forced on him that didymium must not be regarded as compounded of two elements only, but rather as an aggregation of many closely allied bodies. Later researches of Krüss and Nilson have led them to the same conclusion. They have discovered that in didymium obtained from some minerals one of the fainter lines of the normal didymium spectrum is strong, while others usually stronger are almost or quite absent. In this way, by examining a great number of minerals, they found anomalies occurred in the case of almost each of the old didymium lines, and therefore decided that it is a compound body, capable of resolution into at least nine separate components. Identical arguments are brought forward to prove that each of the other so-called elements, samarium, erbium, holmium, thulium, dysprosium, etc., are compounds of many closely allied bodies. Krüss and Nilson question the possibility of resolving the erbia and didymia earths into their several ultimate constituents by a fractionated decomposition of the nitrates. In fact, they assert that by means of the methods of separation at present known it would be almost impossible to completely isolate any single constituent of the mixed earths. They therefore propose, as he had previously done, a method by which we may certainly arrive nearer to the mark and dispense with much tedious fractionation. If we examine the minerals which contain these rare earths we find they occur in very different states of mixture or combination. Sometimes many of the constituents which we wish to separate are conjointly present, and sometimes but few. The desired differentiation, in fact, has already been commenced by Nature. Krüss and Nilson, therefore, whichever ingredient they wish to separate, propose to operate on a mineral which contains that ingredient as far as possible in a state of isolation. In other words, they will take advantage of the work that Nature has already begun, and endeavour by refined chemical means to put the last finishing touches to her work.

The crude earth contained in any single mineral was examined as a whole by Krüss and Nilson, without any attempt to separate the earths, although the composition of some of these minerals is extraordinarily complex.

In his own case the didymium earths, the examination of which led him to form the "one band one element" theory, said the President, were in a much more simple state, as the whole of the yttrium group, including erbium, holmium, thulium, etc., and others, had been removed, and the earth under examination probably contained little besides didymium and lanthanum, with traces only of samarium, yttrium and calcium. But not even here was the earth under examination in a state of even approximate purity.

There are at least two points in these researches which illustrate the necessity of great caution in drawing conclusions from an examination of absorption-spectra. Kiesewetter and Krüss have examined gadolinite, and find that some constituents of didymium and samarium are absent, notably those which produce the group of lines in the green to which the President had referred. He, however, had worked in his own laboratory for the last two years almost exclusively on the earths from gadolinite—of which he had obtained a large quantity from Fahlun—and there was not the shadow of a doubt that in his gadolinite earths the lines reported absent by Kiesewetter and Krüss are present in abundance. Some hitherto unexplained condition doubtless rendered these lines invisible to Kiesewetter and Krüss; perhaps the presence of some other earths, or some condition of concentration or acidity. In the light of this knowledge he did not see how we can take Krüss and Nilson's or his own results as final.

Little is yet known concerning the influence of one body on another, but that little is of sufficient importance to make us very careful how we interpret absorption-spectra when uncorroborated by chemical results. Lecoq de Boisbaudran and Smith have pointed out some important modifications produced in absorption-spectra by an excess of acid, and later on Soret verified these observations. Again, Brauner and others have recorded experiments on mixing solutions of didymium and samarium. They find, in the case of a didymium solution showing the group of three bands, $1/\lambda^2$430·4, 441·3, 454·6, that by adding a dilute solution of samarium, all three of these bands vanish without any appearance of any of the samarium bands, until a certain proportion is reached, when the samarium bands gradually come in their place. In his own experiments he found that from a solution of erbia which originally shows no trace of the strong didymium band $1/\lambda^2$292, appreciable quantities of didymium can certainly be squeezed out by fractionation.

The Erbium Group.—The oxide ten years ago called erbia, and regarded as belonging to a simple elementary body, has been resolved by the investigations of Delafontaine, Marignac, Soret, Nilson, Cleve, Brauner and others into at least six distinct earths—three of them, scandia, ytterbia and terbia, giving no absorption-spectra, whilst others, erbia (new), holmia and thulia, give absorption-spectra. According to Lecoq de Boisbaudran, holmium is a mixture of true holmium with dysprosium, but this latter, the President believes, consists of at least two simpler bodies; and fractionation experiments had led him to recognize the existence of still another earth of the erbium group.

The Yttrium Group.—Yttrium—the old yttrium—proves now to be not a simple element, but a highly complex substance. He had come to the conclusion, said the President, that it may be split up certainly into five, and probably into six, constituents. These constituents of the old yttria are not *impurities* in yttria any more than praseodymium and neodymium are impurities in didymium. They proceed from a real splitting up of the yttrium molecule into its components, and when this process is completed the old "yttria" has disappeared. One of the most distinct characteristics of "old yttria" is its very definite spark spectrum. To which of its components this spark spectrum belongs, he was not yet able to say. It is possible that the particular component to which the spark spectrum is due yields no phosphorescent spectrum. It is also possible that the spark spectrum, like "old yttria," may prove to be compound, and then the well-known lines it contains will have to be shared between two or more of the newly-discovered bodies. At present no single component of old yttria can lawfully lay claim to what may be called the paternal name; so in the present state of the question no one is entitled to call one of the new bodies "yttria," and to characterize the remainder as impurities.

A possible explanation of the existence and nature of the new bodies into which "old yttrium" has been split up, and of parallel cases which will doubtless be found on closer examination is this. Our notions of a chemical element must be enlarged. Hitherto the elemental molecule has been regarded as an aggregate of two or more atoms, and no account has been taken of the manner in which these atoms have been agglomerated. The structure of a chemical element is certainly more complicated than has hitherto been supposed. We may reasonably suspect that between the molecules we are accustomed to deal with in chemical reactions, and the component or ultimate atoms, there intervene sub-molecules, sub-aggre-

gates of atoms, or meta-elements, differing from each other according to the position they occupy in the very complex structure known as "old yttrium." The arguments in favour of the different theories are as yet not unequally balanced. But the assumption of compound molecules will perhaps account for the facts, and thus legitimate itself as a good working hypothesis, whilst it does not seem so bold an alternative as the assumption of eight or nine new elements.

A compound molecule may easily act as an element; of this, didymium is an example, having been subjected to the closest scrutiny by some of the ablest chemists in the world without being resolved.

We have, in fact, a certain number of reagents, operations, processes, etc., in use. If a body resist all these and behave otherwise as a simple substance, we are apt to take it at its own valuation, and to call it an element. But for all that, it may, as we see, be compound, and as soon as a new and appropriate method of attack is devised we find it can be split up with comparative ease. Still, we must never forget that, however complex, it can hardly be resolved into more than two parts at one operation.

We need some criterion for an element which shall appeal to our reason more clearly than the old untrustworthy characteristic of having not as yet been decomposed. It may be that whatever body gives only one absorption-band is an element, but we cannot conversely say that an element may be known by its giving only one absorption-band, since most of our elements give no bands at all! Until these important and difficult questions can be decided, he had preferred to open what may be figuratively called a suspense account, wherein we may provisionally enter all these doubtful bodies as "meta-elements." But these meta-elements may have more than a mere provisional value. Besides compounds, we have hitherto recognized merely ultimate atoms, or the aggregations of such atoms into simple molecules. But it becomes more and more probable that between the atom and the compound we have a gradation of molecules of different ranks, which, as we have seen, may pass for simple elementary bodies. It might be the easier plan, so soon as a constituent of these earths can be found to be chemically and spectroscopically distinguishable from its next of kin, to give it a name, and to claim for it elemental rank; but it seemed to him the duty of a man of science to treat every subject, not in the manner which may earn for him the greatest temporary κῦδος, but in that which will be of most service to science.

Throughout the address, attention was directed to the various spectra, and to the methods of producing them; the action of different earths, etc., on phosphorescence spectra was also specially considered.

Professor Dewar proposed a vote of thanks to the President, coupled with the request that he allow his address to be printed.

Dr. Gladstone seconded the motion, which was carried by acclamation.

The President briefly responded.

Dr. Russell, the Treasurer, then gave an account of the financial position of the Society. The receipts by admission fees and subscriptions had been £3,402; by sale of Journal, £365 3*s.* 3*d.*; and by dividends on invested capital, £334 4*s.* 3*d.* The expenses on account of the Journal had been £2,350 5*s.* 11*d.*; on account of the Abstracts of Proceedings, £164 4*s.* 7*d.*; on account of the Library, £308 5*s.* 6*d.*; the total expenditure being £3,429 18*s.* 3*d.* £500 had been invested in Metropolitan Board of Works 3½ per cent. stock, and the balance in hand was £1,833 10*s.* 6*d.*, the balance at the corresponding period last year having been £1,672 19*s.* 3*d.*

Professor Thorpe moved that the thanks of the Society be tendered to the Treasurer for his services during the past session.

Dr. Perkin seconded the motion.

Dr. Russell, after replying, proposed a vote of thanks to the auditors, Messrs R. H. Davies, Friswell, and Rideal; this was seconded by Dr. P. F. Frankland, and acknowledged by Mr. Friswell.

Mr. J. Newlands proposed a vote of thanks to the Officers and Council, which was seconded by Dr. J. Voelcker, and acknowledged by Dr. Armstrong.

Professor Clowes moved that the thanks of the Fellows be tendered to the Editors, Abstractors, and Librarian for their important services during the year.

Dr. Collie seconded the motion.

Mr. Groves and Dr. Thorne replied.

Messrs Foster and E. W. Voelcker having been appointed Scrutators, a ballot was taken, and as result the following were declared elected as Officers and Council for the ensuing session.

President: W. J. Russell, Ph.D., F.R.S.

Vice-Presidents who have filled the office of President: Sir F. A. Abel, C.B., D.C.L., F.R.S.; W. Crookes, F.R.S.; Warren de la Rue, D.C.L., F.R.S.; E. Frankland, D.C.L., F.R.S.; J. H. Gilbert, Ph.D., F.R.S.; J. H. Gladstone, Ph.D., F.R.S.; A. W. Hofmann, D.C.L., F.R.S.; H. Müller, Ph.D., F.R.S.; W. Odling, M.B., F.R.S.; W. H. Perkin, Ph.D., F.R.S.; Sir Lyon Playfair, Ph.D., K.C.B., F.R.S.; Sir H. E. Roscoe, LL.D., F.R.S.; A. W. Williamson, LD.D., F.R.S.

Vice-Presidents: G. Carey Foster, F.R.S.; J. W. Mallet, M.D., F.R.S.; H. McLeod, F.R.S.; Ludwig Mond; J. Emerson Reynolds, M.D., F.R.S.; Robert Warington, F.R.S.

Secretaries: H. E. Armstrong, Ph.D., F.R.S.; J. Millar Thomson, F.R.S.E.

Foreign Secretary: F. R. Japp, LL.D., F.R.S.

Treasurer: T. E. Thorpe, B.Sc., F.R.S.

Ordinary Members of Council: Norman Collie, Ph.D.; A. H. Church, Frank Clowes, D.Sc.; Wyndham Dunstan; John Ferguson, M.A.; Charles W. Heaton; E. Kinch; H. F. Morley, M.A.; F. J. M. Page; S. U. Pickering, M.A.; R. T. Plimpton, Ph.D.; Thomas Purdie, B.Sc.

BRITISH PHARMACEUTICAL CONFERENCE.

A meeting of the Executive Committee was held at 17, Bloomsbury Square, W.C., on Monday, April 8, at 4 p.m.

Present:—Mr. Umney, President, in the chair; Prof. Attfield, Messrs. Carteighe, Davies, Gerrard, and Mr. Martindale, Hon. Treasurer, Dr. Thresh and Mr. Naylor, Hon. Gen. Secs., and Mr. J. C. Nightingale, Asst. Sec. The minutes of the previous meeting were read and confirmed. Intimations of inability to attend were announced as having been received from Messrs. Conroy, Dott, Groves, Maben, Martin, and Symes.

The approval of the Blue List, submitted by Mr. Siebold, was then considered, and, after a general discussion, it was moved by Mr. Davies, seconded by Mr. Carteighe and carried, that each of the members present take a proof copy of the List, revise it, and return it to Mr. Naylor in a fortnight. Mr. Naylor was empowered to finally correct it and send it to press.

It was announced that the following donations had been received, and the thanks of the Committee were accorded to the respective donors: 'L'Ecole Supérieure de Pharmacie de Paris,' papers for 1888, 1889; Victoria Pharmaceutical Register, 1888; the Report of the Pharmacy Board of Victoria, 1889; Proceedings of the American Pharmaceutical Association, 1888; and The Calendar of the Pharmaceutical Society of Ireland, 1889.

The following eight gentlemen were elected to membership:—Messrs. J. Bemrose, F.C.S., Montreal;

John Marshall, Sheffield; John D. S. Pooley, Wimbledon; A. E. B. Smith, Bombay; A. K. Stewart, Edinburgh; F. S. Stewart, Bombay; A. E. Walker, Bombay; A. Wybrant, London.

Parliamentary and Law Proceedings.

Prosecution for Insufficient Labelling.

At Torquay on Thursday, April 4, before Messrs. W. H. Halliday, L. B. Bowring, and E. Vivian, county magistrates, William Bathe, chemist, of Abbey Road, was summoned for having, on March 18, by his servant William John Rawling, at his branch shop in Lower Union Street, supplied a quantity of syrup of chloral to Thomas Carter Tompkins, since deceased, without distinctly labelling the bottle "Poison," contrary to the statute. It will be remembered that Tompkins was a retired auctioneer, and that he committed suicide by taking an overdose of the chloral mixture bought by him at Mr. Bathe's branch shop.

William John Rawling, assistant to Mr. Bathe, stated that on the afternoon of the day named Tompkins came to him and asked for sixpennyworth of chloral. As chloral was not sold in this way, he gave him a mixture, consisting of an ounce of syrup of chloral (which contained 80 grains) and seven ounces of water. He put this up in an eight-ounce graduated bottle and labelled it, "The mixture: the eighth part to be taken at bedtime." Tompkins took the bottle and left the shop. He came to witness the following day, and, on saying that he slept all right and felt better as the result of taking one dose, witness advised him not to take any more unless he required it. When Tompkins left he understood he would act upon this advice, but the next thing witness heard about him was that he had taken the whole of the other seven doses at once.

As the facts were not disputed, and the only question at issue was as to a point of law, the Bench invited Mr. Bathe to make a statement on his own behalf.

Mr. Bathe said he considered there was no case, as stated in the summons, on the ground that syrup of chloral was not actually supplied, but simply a mixture or bottle of medicine containing that preparation. Therefore, it was exempt from the necessity of being labelled "Poison," as specially provided in clause 17 of the Poisons Act, which distinctly stated, "nor shall any of the provisions of this section apply to any medicine supplied by a legally qualified apothecary to his patient, nor apply to any article when forming part of the ingredients of any medicine dispensed by a person registered under this Act." His assistant was a fully registered chemist under the Pharmacy Act, and he had distinctly stated that he supplied the syrup of chloral in the form of a mixture, and therefore not in such a way as to render it amenable to the charge of not being labelled "Poison." In fact he refused to supply chloral at all as such; but ultimately, in response to the continued solicitations of his customer, with whom he appeared to have been acquainted, he exercised considerable discretion in making up some medicine containing a few small doses of syrup of chloral, placing it in a bottle having the dose graduations marked upon it and distinctly labelling it "The mixture, an eighth part at bedtime." Hence he brought it under the clause exempting medicines containing scheduled poisons when so supplied. This was done with a perfect knowledge of the requirements of the Act, and with no idea of making an infraction of it. Those chemists to whom he had spoken on the subject, expressed a unanimous opinion that no infringement of the Act had been committed. One chemist of repute, writing him in reference to the case, said, "You only did just what every dispensing chemist does every hour of the day, that is, supply a bottle of medicine containing a scheduled poison without labelling the bottle 'Poison,' and the law does not require a bottle of medicine containing poison to be so labelled. It would palpably be absurd to do so. In these cases it is needful, of course, that proper directions should be placed on the bottle, and if then a patient chooses to take eight or ten doses at once, he must take the responsibility and the consequences, not the chemist. Had you supplied chloral or syrup of chloral as such without labelling 'Poison,' you would have been in the wrong, but not when supplied as a medicine, properly diluted. What more can a chemist do? To that extent, at any rate, you appeared to have done all that the law requires or that any reasonable person could expect."

The Chairman (Mr. Halliday) remarked that what the Act meant by a mixture was where there were ingredients, one element of which counterbalanced another. In this case there was syrup of chloral with an addition of water. This was poison diluted, but diluted poison remained poison. It had not been shown to be medicine.

Mr. Bathe submitted that, as the bottle was stated to have been properly labelled as to doses, the mixture was a medicine.

The Chairman held that all poisons, whether diluted or not, should be labelled as such. Mr. Bathe's assistant sold that which, although diluted with water, was nevertheless a poison, and very unfortunate results had occurred.

Mr. Bathe said poisons were often supplied in medicines in a diluted form. It was not necessary that it should be made up from the prescription if it was done by a fully qualified chemist.

The Chairman said the Act would be perfectly nullified if the general rule of labelling poisons was not observed.

Mr. Vivian observed that recently he had a gargle sent to him marked "Poison," and he thought it would be better for chemists to err on the safe side.

The Chairman said the Bench were sorry to have to inflict a fine in this case, but they would be doing wrong if they did not do so. It was very little trouble, and much safer, for chemists to comply with the requirements of the Act, which was passed for the protection of the public. As the penalty was put at £5 in the first instance and £10 for the second offence, it was evident that it was contemplated to deal severely with those who infringed the Act. In the present instance the fine would be £1, including costs, and the magistrates hoped Mr. Bathe's assistant would be wiser another time.—*The Western Morning News.*

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Medicine Stamps.

Sir,—Except that you are forbid to tell the secrets of your prison house it would be worth while asking you what authority is at the back of your leader of April 6.

Editors in the abstract are supposed to have infinite wisdom and unbounded knowledge, whereas if the article were written under your own name, it might be said that the opinion of B. H. Paul was not a great deal better than that of B. S. Proctor and the Newcastle committee. But in the absence of information regarding your authority I suppose we must assume that the article is your own and that you think you know the laws bearing upon the stamp duty. You would do a service to the trade if you could clear up one or two points. First, give us the letter of the law which declares that the possessive case of a proper

name preceding the name of a medicine constitutes it a proprietary medicine; or, failing that, give us the letter of the law which authorizes the executive to make such a law out of those which were enacted by Parliament.

Those of the trade with whom I have been acting, and I cannot acknowledge that they are discreditable members of the Pharmaceutical body, say they do not hold out Gregory's Mixture, Blaud's pills, or Fowler's solution to be nostrums or proprietary preparations when they attach the customary labels to them. This is not a question of law but a question of fact, and the fact is that they are not any one's nostrums or property and they do not hold them out to be such.

It may be according to law that a chemist who holds out a preparation as a nostrum, and does not stamp it, is liable to a penalty, but the fact should be proved before a penalty is inflicted. He should not be called upon to prove his innocence, but the accuser should prove his guilt, and this is not done by quoting the label with its possessive case, unless the Act clearly defines that the possessive case renders the label liable to duty.

May I ask you as a favour that you will tell your readers if the label "Fowler's solution" involves stamp duty?

I believe you are not in the habit of giving judgment upon such points, but while you are saying that it is not creditable to the members of the pharmaceutical body to be unable to decide a point of this kind it cannot involve any trouble or responsibility to answer this simple question.

The next point requiring elucidation is, when the Board has given a decision on a particular label how long that decision is to remain in force. If a label was ten years ago declared to involve no liability, can it be held to involve liability now? Or if a label is now declared to involve no liability, will it in the absence of a new Stamp Act be exempt ten years hence? Is the will of the Board sufficient to change these points, or is an Act of Parliament necessary to do so?

If the law is so clear that it is a discreditable thing for pharmacists to fail to understand it, how is it that in the words of your leader, "this very comprehensive character appears indeed to have been for a time very much overlooked by the Inland Revenue authorities"?

There are sundry other points upon which I might make queries or comments, but as the correspondence opened with the Board of Inland Revenue is not yet concluded, I will not at present trouble you with them.

Newcastle. BARNARD S. PROCTOR.

Sir,—As the subject of stamp duty is again under discussion, I beg you will permit me to urge my grievance against it in your columns. Although I object strongly to the drafting of the Act, and should be glad to see it either repealed or amended, it is the administration of it against which I now desire to enter a protest.

In my opinion, the real cause of so many threatened prosecutions for trivial infringements of the Act is that the informers receive part of the penalties, and as these are usually paid on demand it has furnished an easy and lucrative employment to two or three of the Inland Revenue assistants, who have devoted themselves to this branch. The practice is about equivalent to paying policemen according to the convictions they procure, and is certain to result in charges being brought merely to obtain the penalties. At the present time the Inland Revenue Department is apparently more anxious to obtain penalties than to have the law obeyed.

In my own case I strongly suspect that an information was laid against me by an "assistant," who was spending his holiday in the neighbourhood, and possibly thought it an easy way of covering his expenses. The charges were utterly trivial. They were based on the terms of a trade circular, the labels being admittedly non-liable.

The first was an implied recommendation of a "quinine and iron tonic" by the use of the words, "of great value in all cases of weakness or debility." Mr. Alpe states in his book (p. 101) that "weakness of the stomach" and "constitutional weakness" are not considered ailments involving liability by recommendation, so that I am still uncertain whether I have not been unjustly treated in regard to it. Apparently if I had put "Of great value in all cases of weakness of the stomach and constitutional weakness," it would have been exempt.

Another claim was in some respects peculiar. I had unfortunately advertised on the same sheet a toothache essence, which I afterwards found clearly involved liability. Not wishing to waste the circulars, I withdrew the article, destroyed all labels, and put up a non-liable one. The contention appeared to be that the new article had been supplied when the advertised one was demanded, but I and my assistants were prepared to deny any such sale, whilst the only proof of it was the statement of an informer who had a direct pecuniary interest in obtaining my conviction. It was hardly a case that I cared to fight, after having unwisely exposed myself to the chance of misconstruction, and therefore I settled the matter.

I would urge all members having parliamentary influence, and especially the Council of the Pharmaceutical Society, to take steps to have this system of administering the Act exposed in the House of Commons by means of a question to the Chancellor of the Exchequer.

I hope that this letter may induce someone with influence to pursue the matter.

Colchester. A. WEDDELL.

THE RESTRICTIVE WEB.

Sir,—I have read with interest your leading article upon the Medicine Stamp Act in your last issue.

Will you excuse me saying, I think you overlook altogether one phase of our grievances. We are not so deficient in our comprehension but that we can perceive, quoting from the article, "the restrictive web cast over the sale of medicinal preparations by the Act is very comprehensive," but our difficulty is the irreconcilable differences between the Act and its application. An Act which takes cognizance of "all chemical and official preparations whatsoever to be used or applied externally or internally, or medicines or medicaments for the prevention, cure or relief of any disorder or complaint incident to or in anywise affecting the human body," is of very serious import, and affects very closely the interests of those who carry on their occupations for these specified purposes.

The mesh of the net is so closely woven, that there is hardly a chemist in the kingdom who is not daily breaking through it, and if the Act were rigorously enforced none of us would escape the penalty, from the President of the Society to the humblest individual in the trade.

In proof of this I ask how are the following prescriptions I had the other day to be dispensed without breaking the law as defined by the Board of Inland Revenue?—

℞ Syr. Hypophosph. Co. (Fellows') ℥iss. coch. min. bis die ex aqua, and

Lactopeptine gr. x., ft. pulv., mitte xij.

In the *Chemist and Druggist*, December 1, 1888, there is published a letter from the Board of Inland Revenue dated November 21, 1888, in reply to an inquiry made respecting the dispensing of lactopeptine, Fellows' syrup, etc., from which I make the following extract:—"But should the chemist sell the preparations *in any other manner than as a component part of a medicine* prepared in accordance with a prescription of a qualified medical practitioner, the penalties imposed by law would have to be enforced. It must therefore be clearly understood that the concession is intended to apply only in cases where the lactopeptine is *used as one of the ingredients* so prepared, and does not extend to cases where it is dispensed unmixed with any other ingredient, preparation or drug." The restrictive web is certainly very comprehensive.

There is a lame attempt to get over the difficulty given in Mr. Alpe's handbook as follows:—"The retailer may break open duly stamped inclosures of dutiable medicines and sell the contents without paying further stamp duty, provided that he does not inclose them in a packet, box, etc., which in practice means that he may only sell them loose or merely wrapped in paper, or to a customer who brings his own box or bottle."

It would appear from the above the Board claim the power to restrict the physician as to the manner in which he may prescribe, and the chemist how he is to dispense proprietary medicines.

It may be said there has as yet been no case of a chemist being fined for dispensing a prescription as written, but the Board has clearly warned us by the above letter it would impose the penalty. If, therefore, we adhere strictly to the law, or rather to the Board's and Mr. Alpe's interpretation of it, we must either affix a patent medicine stamp over the bottle or box, and ask the patient to bring

his own box or bottle, or inform him we can only supply it in stamped original bottles.

An Act, which to make it at all tolerable requires the executive to wink at its infringements and introduce exceptions without the authority of an Act of Parliament, but to keep the Act from getting rusty to occasionally pounce upon an unfortunate victim, is not one that commends itself to my respect.

Why should we continue to carry on our occupations under the permission of a Board which puts its own interpretations upon this Act, and allows or disallows at its good pleasure?

It would be preferable that the Board did rigorously and universally enforce the law, from the highest pharmacy to the lowest drug store. Such a furore would be produced that the Stamp Act would soon be struck off the Statute Book. R. Hayton Davis.

Methylated Spirit and Medicated Wines.

Sir,—The thanks of the trade are due to the President and those members of the Council who, acting with him, were instrumental in obtaining the concession from the Somerset House authorities concerning the use of methylated spirit in liniments. That is one of our grievances removed. There is another one crying aloud for removal, and that is the necessity of having to take out a licence for the sale of medicated wines. If the Council could help us in that matter, somewhat on the lines laid down in your leader a few weeks ago, they would earn the gratitude of a majority of the trade. It is not right that the chemist should have to appear in court along with the applicants for beer licences, etc., and beg as a favour for what he ought to have as a right. It is, to say the least, humiliating, besides running the risk of incurring the odium and opposition of the temperance party.

I think Mr. Hayton Davis is under a misapprehension in thinking that licensed retailers of methylated spirit are precluded from taking out a wine licence. I understand that is not so, and that both licences may be held provided the wines are sold in sealed bottles.

Horwich. ——— S. Phillips.

What is the Use of the Pharmaceutical Society?

Sir,—I heartily endorse the sentiments expressed in the letters of Mr. Munday and Mr. R. H. Davis in the Journal of last week, and feel sure that the chemists of this town are unanimously of opinion that the burning question of the day, viz., the Medicine Stamp Act, and the way in which it is administered, constitutes a real and vexatious grievance. They are also amazed at the lethargy and supineness of the Council in not endeavouring to put an end to these evils.

It is certainly high time that the members should elect representatives more in sympathy with the feelings of the country chemists, and men who will bear in mind that one of the objects for which the Society was founded is stated in the Charter to be, "the protection of those who carry on the business of chemists and druggists."

As it is pointed out, we have the remedy in our own hands. Then I appeal to all to vote, and vote only for those who will promise to really interest themselves in the welfare of the trade.

Will the required men not be forthcoming?

Cardiff. ——— A. Coleman.

Sir,—I think that Mr. R. H. Davis' letter, published in last week's Journal, deserves the consideration of chemists and druggists generally, and every candidate for the Council should be requested to make some statement respecting the course of action in reference to the administration of the Stamp Act, the sale of medicated wines, and the proposed railway rates—a great consideration to country chemists.

The mode of administration of the Stamp Act is very arbitrary and perplexing. Why certain preparations with name attached, and recommended on the labels and wrappers, "to *cure* sea-sickness, &c.," and which are largely advertised, should *not* be liable, as it has been decided in our law courts, while others recommending nostrums for the *relief* of a disorder should be liable, while perhaps they are only mentioned briefly on a handbill, is, to my mind, inexplicable, and if the officials in the stamps department are applied to, their explanation is not always very lucid. We cannot all rush into the Law Courts, but I believe in many cases a good defence could be made and decisions in favour of defendents obtained. The process is too costly for most of us. As to the sale of medicated wines, they are for the relief of the sick and invalids, and few, if any, would think of drinking them for their own gratification or introducing them to their personal friends while entertaining them at the social board. To all intents and purposes they are *medicines*, and there is no fear of their taking the place of the ordinary wines, or of interfering with their consumption.

I do hope that the old members of the Council, as well as the newly elected, whoever they may be, will not let these matters rest until the laws respecting them are altered and respectable chemists are relieved of their perplexity and risk.

I am pleased to see that the subject is to be brought before the House of Commons on the 30th inst.

Harwich. ——— C. F. Bevan.

Origin of the British Flora.

Sir,—As no further correspondence on this subject has been evoked by the letter of C. J. S. (*Pharm. Journ.*, March 30), perhaps I may be allowed to say in reply that I do not consider the explanation there given of the presence of plants of the Spanish and American types in the west of Ireland at all likely to be the correct one.

I am unable to produce direct evidence of the existence of these species in their present localities previous to the date of the Armada, but I believe this to be due to the fact that even English plants had scarcely been examined at the period in question, whilst Connemara in the reign of Queen Elizabeth was absolutely outside the pale of civilization. In recent times, however, every plant found in the United Kingdom has been subjected to the closest scrutiny as to the situations in which it grows and other circumstances respecting its occurrence, in order to ascertain whether it is truly indigenous, or whether it may have been introduced by man either purposely or accidentally. The Spanish plants have successfully withstood this critical examination of their claim to be regarded as natives, and I think that plenty of indirect evidence may be found to support the latter view. In the first place the plants characteristic of the group are not cornfield weeds, the seeds of which would be likely to occur amongst grain, but they are moorland and mountain plants, such as the heaths and saxifrages. It may also be pointed out that though many thousand times the quantity of grain carried by the ships of the Armada is now imported into this country every year, and many foreign plants consequently spring up in our cornfields, only occasionally has a species succeeded in establishing itself firmly in this country, and there is no instance of a whole group of plants like those peculiar to Kerry and Cork having originated in this way. We may notice too that the ill-fated galleons of the Armada were wrecked on many other parts of our coasts besides those which have been referred to, and that though vessels habitually sailed direct from the New World to Spain, no American species were introduced into the latter country.

For these reasons it appears that we must look to physical and geological causes, and not to accidental ones, to account for the presence of this interesting section of the British flora.

17, *Bloomsbury Square.* Wm. A. Salter.

Syr. Ferri et Quininæ Hydrobrom.

Sir,—Some of your correspondents have thrown some doubt on the accuracy of my note on syr. ferri et quininæ hydrobrom. B.P.C., by suggesting the possibility of my having used the normal instead of the acid hydrobromate of quinine. In reply, will you allow me to state that I have always used the acid salt, and have noticed the crystallization on three or four occasions. R. A. Cripps.

Erratum.—On p. 819, col. ii., line 5, in the Obituary notice, *for* Mr. Edward Stewart Payne, *read* Mr. Ebenezer Stewart Payne.

R. Winfrey.—We fail to perceive any ground for you protest.

F.S.—We think it would be advisable to treat such preparations as coming within the provisions as to "poisonous vegetable alkaloids," especially if the strength of the solution be considerable.

Communications, Letters, etc., have been received from Messrs. Schimmel and Co., Hill, Armstrong, Ferrall.

ACTION OF TARTARIC ACID ON MERCURIC CHLORIDE.*

BY D. B. DOTT, F.R.S.E., F.I.C.

It was long ago established that corrosive sublimate is a powerful antiseptic, and within recent years its use in surgery has largely increased. The strength of solution employed varies according to the purpose for which it is applied, but in all cases it is highly dilute, sometimes 1 part of chloride in 4000 of water. The power which mercuric chloride possesses of coagulating albumen has been found to be an objection to its use, particularly in obstetric practice, and to obviate this objection the addition of various substances to the solution has been suggested. Among those substances which prevent or diminish the coagulating effect of the mercuric chloride, tartaric acid holds a prominent place, as the addition of that acid to the solution, undoubtedly, to a great extent retards the coagulation. There is, however, an objection to the use of tartaric acid for the purpose mentioned, which does not appear to have been previously pointed out, and to which I think it is worth while to call attention.

When a dilute solution of mercuric chloride and tartaric acid is prepared, a white precipitate slowly makes its appearance, and increases in amount as the solution is allowed to stand. This precipitate is found to be insoluble in water and to blacken on the addition of caustic soda; sufficient evidence that it consists of calomel. It is, of course, not at all surprising that tartaric acid should act as a reducing agent in this instance, as it does in many others; but the fact might readily be passed over, seeing that there is no precipitate on boiling a solution of mercuric chloride and tartaric acid, at least not in a moderate time. Whether in such a solution as that before referred to, the whole of the mercury would ultimately be precipitated as calomel, is a point I have not determined, but it is evident that there is a risk of the solution being considerably weakened if it be kept for any length of time.

[*The discussion on this paper is printed on p.* 849.]

GLYCERITES OF FERROUS SALTS.*

BY CHARLES ARTHUR.

Liquid preparations of ferrous salts, such as the syrup of iodide of iron, have always been a source of difficulty and trouble to pharmacists. This is due to the facility with which such solutions absorb oxygen, and become changed into the ferric condition, and many suggestions of a more or less satisfactory kind have from time to time been made to obviate this objection. The plan now generally adopted, and the one which has been perhaps most successful is the addition of a small percentage of free hypophosphorous acid; even this, however, is not always found to be satisfactory. It is well known that glycerine possesses the property of preventing oxidation of ferrous salts, and even of reducing ferric salts to the ferrous state. Its sweetness also makes it a convenient substitute for sugar. From these properties it occurred to me that it would be a very suitable vehicle for a preparation analogous to the official syrupus ferri iodidi, and at the same time free from the objections to which the latter is liable. Some time ago I first prepared several such preparations, to which, following the example of the U.S. Pharmacopœia, I have applied the name glyceritum or glycerite, and after a considerable experience they have proved satisfactory.

Referring to the literature on the subject, I observe that the idea has occurred to others as well as myself. M. Veza (U. S. Dispensatory, p. 1796) gives a formula for a 20 per cent., and S. Plevani (Year Book, 1885, p. 266), a 23 per cent. solution of ferrous iodide in glycerine. These suggestions do not however seem to have attracted general attention, and I have thought it might be useful if I were to bring before you some of my experience, and one or two working formulæ. The formula for glyceritum ferri iodidi from which I have been accustomed to work is designed to yield a product containing 10 per cent. of ferrous iodide, but adapting the proportions to the standard of the syr. ferri iodidi B.P., the following formula will be found to work well:—

Glyceritum Ferri Iodidi.

Take of—	
Iron	1 oz.
Iodine	2 ozs.
Distilled water	3 fl. ozs.
Glycerine	27 fl. ozs.
	or a sufficiency.

Mix two ounces of the water with an equal volume of glycerine in a flask, and in this mixture digest the iodine and iron, heating slightly, and occasionally shaking until the froth becomes white, then filter the liquid into 26 fluid ounces of the glycerine, rinse the flask and iron wire, and wash the filter with the remaining ounce of water. There is no provision in the B.P. for washing the filter, hence there is loss of iodide. Mix and make up the measure of the product when cold to 31 fluid ounces. Its specific gravity should be about 1·300. It contains 4·3 grains ferrous iodide in 1 fluid drachm.

The specific gravity of glycerine varies slightly, and where the strength and dose are calculated on the fluid measure it ensures greater accuracy to make up the product to a definite quantity as above, than to a definite weight, as in the case of the official syrup. ferri iodidi.

Another syrup for which there has been some demand, and which has also been a source of annoyance to many pharmacists, is the syrup of bromide of iron. I have had entirely satisfactory results with a glycerite of this containing 5 grains of ferrous bromide in the fluid drachm. It is made by the following formula:—

Glyceritum Ferri Bromidi.

Take of—	
Iron	385 grains.
Bromine	770 grains.
Distilled water	3 fl. ozs.
Glycerine	26 fl. ozs.

Proceed in the same way as for glyceritum ferri iodidi. This glycerite contains about 5 grains in the fluid drachm, and has a specific gravity of about 1·300.

Samples of these preparations are on the table, one of each recently prepared, and one of each at least two months old.

The same idea can, of course, by suitable manipulation be applied to liquid preparations of other

* Read before the Pharmaceutical Society of Great Britain at an Evening Meeting in Edinburgh, Tuesday, April 9.

ferrous salts, such as hypophosphite, phosphate, protochloride and sulphate, and to mixtures containing any of these.

On the same lines, a couple of years or so ago, I prepared a substitute for Blaud's pills by making a glycerite of ferrous sulphate and a syrup of carbonate of potash, 5 grains of each in the drachm, but such a preparation has the disadvantage of being more difficult to manage than pills.

So far as appearance, taste and properties are concerned, these glycerite preparations are all that could be desired. They have recently been used to a considerable extent in hospital and private practice. I am able to state that Dr. Carmichael, of Mansfield Place, Edinburgh, has used the glycerite of iodide of iron pretty extensively of late, and I have further testimony regarding the glycerite from Dr. Jamieson, resident physician, in the University wards under Professor Greenfield, Edinburgh Royal Infirmary. He says the drug is extremely palatable in this form, whereas in the other form it is not, and that all the properties of the drug are retained, and that it agrees extremely well with strumous children.

Dr. Lockhart Gillespie, resident physician in Dr. Claud Muirhead's ward, Royal Infirmary, says that it makes a very nice compound, which to all appearance has good keeping properties, and serves as a good tonic for convalescing patients. Dr. Gillespie states that he hopes to give these preparations an extended trial in diseases of children during the coming summer, when he will be physician to the Sick Childrens' Hospital, Edinburgh.

I would submit one or two points in favour of the ferrous liquids being prepared with glycerine.

Glycerine is not objectionable, but the reverse, in all cases in which ferrous salts are used. Bromides and iodides are said to be useful in diabetes, but, of course, as syrups, could not be given; compounded as glycerites, however, the sugar objection is at once overcome. Some medical authorities are said to be averse to the administration of sugar to strumous patients. Syrup frequently causes acidity. Glycerine prevents it.

In the 1885 formula for the official syrup of iodide of iron, a portion of the sugar is changed into invert sugar by boiling, with the view of retarding oxidation. I would suggest that instead of this a certain proportion of glycerine should be added. I believe this would be quite as effectual and less objectionable than hypophosphorous acid. But I trust I may be excused for suggesting that it might be worth while considering whether the syrup might not be discarded altogether, and the glycerite substituted.

[*The discussion on this paper is printed on p.* 851.]

FIXING OF THE SPORES OF HYMENOMYCETES.

Dr. C. O. Harz proposes the following plan for preserving the spores of hymenomycetous fungi. Colored spores can be very well fixed on white paper by moistening the reverse side of the paper with a solution of canada balsam in absolute alcohol. In the case of colorless spores, the difficulty is to find a coloured paper the pigment of which is not soluble in alcohol. Dr. Harz overcomes this difficulty by using instead a slightly warmed solution of 1 vol. canada balsam in 4 vols. turpentine oil, placed with a fine camel's-hair brush on the reverse side of the paper. In the course of from two to four days the preparation can then be laid aside between paper, but the spores are not completely fixed for several weeks.

NOTES ON ESSENTIAL OILS FROM MESSRS. SCHIMMEL AND CO.'S REPORT.*

(*Continued from page* 804).

Almond Oil.—Under this head reference is made to the advantage that would result in the improved colour of almond oil if a practical method of blanching the almonds could be introduced. It would be an indispensable condition that the almonds should not require to be moistened, because otherwise the formation of the essential oil of bitter almonds would be induced and the fixed oil would acquire a strong bitter taste and contain a trace of hydrocyanic acid.

Cassia.—With respect to cassia oil Messrs. Schimmel state that the greater part of that found at present in commerce is sophisticated in the most shameful manner. The oil appears to be obtained by the dealers in Hongkong, Macao, and Canton through native agents who get it direct from the Chinese who produce it. As to the particular place from which it comes no information is available; only this is certain, that it is not manufactured in Macao, the place designated on all the labels. It is therefore thought most probable that it is sophisticated by the producer, and sent in this condition into the market. In Hongkong it is the custom among the dealers to have the oil examined in a "medical hall" and its genuineness certified. The value of this guarantee may be judged from the fact that a sample certified to be unadulterated oil of cassia, 1·060 sp. gr., dissolving readily in alcohol of 80° T. and perfectly volatile, proved to contain 20 per cent. of solid resin—colophony or pitch—and a corresponding quantity of petroleum, probably added to regulate the specific gravity and consistence. The three following brands are mentioned as having been found grossly adulterated: yellow label with the American eagle: Yan Loong, Macao; yellow label with sailing-vessel: Cheong Loong, Macao; rose-coloured label, with wreath of flowers: Luen Tai, Macao. The oil was noticeable superficially for its dark brown colour and consistency. Upon shaking it in a flask it remained adherent to the sides for a long time. The specific gravity corresponded tolerably well with the statement in the certificate, varying between 1·052 and 1·065. The boiling-point lay between 200° and 265° C. As a residue after distillation there remained in the retort from 23 to 26 per cent. of a solid brittle resin. In order to exclude any doubt as to whether this resin might possibly have resulted through heating over an open fire several canisters of each of these brands of oil were submitted to distillation in a current of steam. The greater part of the distillate sank in the water, but a portion collected on the surface and this lighter portion was identified as petroleum. In the residue after distillation there was found from 19 to 26 per cent. of the same solid brittle resin. On the other hand, a brand bearing a red label with the words, "Best Cassia Oil, Ying Chong, Macao," has been found to be of good quality, the loss on rectification being only 7 per cent., and the residue being liquid. The rectified oil should have a specific gravity of 1·055 to 1·065.

Eucalyptol and Eucalyptus Oil.—The demand for pure crystallized eucalyptol, for medicinal purposes, is said to be continually increasing. Of the *Eucalyptus Globulus* oil there seems to be a probability of over production, the yield from upwards of 3,000,000 trees in Algeria being now available, besides the Californian oil, which is already placed with difficulty. The use of the ordinary eucalyptus oil as a perfume is criticized and a

* *Errata.*—In the previous notice of this report Messrs. Schimmel's place of business was inadvertently stated to be at Dresden instead of Leipzig. In addition, the equivalent of 42,000 kilos of anise oil should have been given as 1400 *cases* of star-anise oil instead of 1400 *canisters*.

passage is quoted with approval from Piesse's 'Art of Perfumery,' to the effect that so long as perfumery is an art of sweet odours such an oil cannot be described as a perfume. More favourable mention is made of oils distilled experimentally from *Eucalyptus maculata*, var. *citriodora*, and *E. Staigeriana*, as having a beautiful melissa odour; from *E. dealbata*, as having a fine lemon and melissa odour; and from *Backhousia citriodora*, as having an intense verbena odour. The cost of the materials is, however, too great to allow of these oils being produced as commercial articles. Another oil, of which samples have been received recently from Adelaide, South Australia, is described as having been distilled from the leaves of *Eucalyptus odorata*, a material of which there is an abundance available. The samples included the crude oil, sp. gr. 0·093 at 16° C., and the rectified oil, sp. gr. 0·909 at 18° C., both of which gave a strong eucalyptol reaction with hydrobromic acid, but no phellandrene could be detected. In addition there was some "residue from the rectification," which appeared to be the portion of the oil having the highest boiling point (boiling between 220° and 260° C.). This fraction, which is a brown liquid and has a sp. gr. of 0·945, is said to be sought after in Australia as a soap perfume. The odour is said to strongly resemble that of cuminol, the presence in it of which body has been detected.

Eucalyptol (Cineol) appears to be one of the most widely-distributed constituents of essential oils. Up to the present it has been found in the following oils:—

Oil.	Origin.	Discoverer.
Wormseed	*Artemisia Cina*	Wallach and Brass.
Cajeput	*Melaleuca Leucodendron*	Wallach.
Eucalyptus	*Eucalyptus globubus*	Jahns.
	E. amygdalina	Wallach and Gildemeister.
	E. Bayleyana	Schimmel and Co.
	E. microcorys	Schimmel and Co.
Rosemary	*Rosmarinus officinalis*	Weber.
Spike	*Lavandula spica*	Voiry.
Cheken leaves	*Myrtus Cheken*	Weiss.
Myrtle	*Myrtus communis*	Johns.
Camphor	*Laurus Camphora*	Schimmel and Co.

Geranium Oil, Turkish.—This essential oil is said to be sometimes adulterated with fixed oils, cocoa-nut oil being used not unfrequently to the extent of 20 per cent. The adulteration can be detected by standing the flask containing the oil for some hours in a cooling mixture, when the cocoa-nut oil separates as a white substance.

Hop Oil.—The oil distilled from the unsulphured hops is said to be in good demand, whilst that distilled from lupulin appears to have gone quite out of use.

Iris Oil.—In the distillation of iris root the method of adding sulphuric acid in order to convert the starch into dextrin and glucose is frequently followed. In this way the yield of oil is increased, but the delicacy of its odour is said to be injured. The pure oil, free from myristic acid, which is largely present in commercial specimens, is described as worth its weight in gold.

Kesso-root Oil.—The Kesso root which in a previous report (see before, p. 327) was designated "Japanese valerian root," and attributed to *Patrinia scabiosæfolia*, Link., has been the subject of a communication from Mr. J. Murai, of Tokio. He says that the *Patrinia scabiosæfolia*, called by the Japanese "Ominameshi" and by the Chinese "Hai-sho,"—literally, putrid soy,—grows wild throughout Japan, but is collected for medicine only to a slight extent. The root is whitish, larger and harder than that of *Valeriana officinalis*, and does not smell so strongly after having been exposed to the air. Some *Patrinia* root collected and submitted to distillation last year by Mr. Murai yielded 0·25 per cent. of a deep green oil, having an odour quite different from that of valerian oil. On the other hand the Japanese valerian ("Kesso" or "Kanokoso") and the European valerian, both cultivated in the Botanical Gardens, Tokio, yielded respectively 3·78 and 1·69 per cent. of oil. He believes therefore that probably the "kesso root" distilled by Messrs. Schimmel was from *Valeriana officinalis*, L., var. *angustifolia*, and not from *Patrinia scabiosæfolia*, Link. In this opinion Messrs. Schimmel concur, since the "kesso root" worked by them was strikingly similar to European valerian root, and did not correspond to the above description of *Patrinia* root. The yield of oil obtained, however, from the sharply-dried root was about 8 per cent., though it is thought that this great difference in the yield may be due to Mr. Murai having used fresh undried root.

Petitgrains Oils.—The over production of this article in Peru has greatly affected its value, and in large parcels it is said to be now quite unsaleable. In view of the possibility of stock remaining on hand a long time a hint is given as to the superiority of recent distilled oil.

Peppermint Oil.—In the case of peppermint oil also the consumption is considered not to stand in any sound relation to its enormously increasing production. The following is an estimate of the production of this oil in different parts of the world in 1888:—

		Kilos.
America—New York State	about	35,000
„ Michigan State	„	27,000
England—Mitcham	„	5,000
„ Cambridge and Lincolnshire	„	1,400
Japan	„	64,000
Italy	„	1,200
France	„	4,600
Germany	„	400
Russia		?
		138,600

Two samples of Italian peppermint oil examined gave the following results:—(1) "Foglie de Menta:" sp. gr. 0·921 at 19°; boiling point about 195°–222°; 44 per cent. distilled between 195° and 210°; 37 per cent. between 210° and 222°; residue 19 per cent. (2) "Fiori di Menta:" sp. gr. 0·915 at 190°; boiling point about 195°–222°; 57 per cent. distilled between 195° and 210°; 36 per cent. between 210° and 225°; residue 19 per cent. Neither sample gave a separation of menthol upon being placed in a freezing mixture. It is considered that according to these results both these oils range in quality below fine American oils. A sample of Russian peppermint oil gave:—Sp. gr. 0·908 at 20°; boiling point about 195°–222°; 46 per cent.; distilled between 195° and 210°; 40 per cent. between 210° and 222°; residue 14 per cent. Placed in a cooling mixture the oil formed a thin paste; it contained consequently a small quantity of menthol.

Rose Oil.—Information is given as to the properties of a pure rose oil, and especially as to the characteristic stearoptene and the possible introduction of spermaceti. The stearoptene of rose oil is a hydrocarbon, C_nH_{2n}, which is not altered by boiling with alcoholic potash solution, whilst spermaceti, which is essentially palmitic-cetyl-ether, is saponified by that reagent, with the formation of potassium palmitate and cetyl alcohol. Upon this fact Messrs. Schimmel have based a method for the examination of an oil.

(1) Isolation and determination of the stearoptene.—Fifty grams of oil are heated with 500 grams of 75 per cent. spirit to a temperature of 70° to 80°. Upon cooling the stearoptene separates nearly entirely. It is removed from the liquid and treated similarly with 200

grams more of 75 per cent. spirit, and this operation is repeated until the stearoptene is obtained perfectly odourless, a second treatment of the crude stearoptene being usually sufficient. In this way the following results were obtained with different samples of German and Turkish oil.

		Grams oil.		Grams stearoptene.	Per cent.
German,	1887:	50	gave	16·2	=32½
„	1888:	50	„	16·9	=34
Turkish,	1887:	50	„	6·3	=12–13
„	1888:	50	„	6·9	=14

(2) Determination of an Admixture of Spermaceti.—3–5 grams of the stearoptene are boiled for five or six hours in a return condenser with 20 to 25 grams of 5 per cent. alcoholic potash solution; the alcohol is then driven off and the residue treated with hot water. Upon cooling the greater part of the stearoptene separates on the surface as a crystalline mass. The alkaline liquor is then poured off, the stearoptene washed with some cold water, then again melted down with hot water, allowed to cool and the water poured off, and this is repeated until the wash-water is neutral. The united aqueous liquor is shaken twice with ether, to remove suspended stearoptene, and after separation of the ether is acidulated with dilute sulphuric acid and again extracted with ether, which upon evaporation should leave no residue (fat acid). As a check the stearoptene, including that withdrawn from the alkaline liquid, is dried at 90° and weighed. There will however be a small loss due to the volatilization of some stearoptene. In a control experiment in which equal to 1·7 per cent. of spermaceti was added to a sample of Turkish oil 1·5 per cent. was recovered.

The melting-points of stearoptene from samples of German rose oil ranged from 35° to 36·5°; those of stearoptene from Turkish oil from 33·5° to 35°; that of the stearoptene from the oil to which 1·7 per cent. of spermaceti had been added was 31·5°–32°.

Rose oil, from which stearoptene has been removed in the above-described manner, is perfectly liquid at 0°; but when placed in a cooling mixture it solidifies to a gelatinous mass, so that it is not quite free from stearoptene. This liquid oil is described as having an extraordinarily fine powerful odour, and as presenting the advantage that when used dissolved in spirit it does not give rise to any crystalline separation.

The following new oils have been prepared experimentally by Messrs. Schimmel during the last six months:—

Mountain Wormwood Oil.—A distillate of the herb *Artemisia glacialis*, known in commerce as "genepi herb" (*genepi des alpes*). One hundred kilograms of the herb yielded 250 grams of an essential oil sp. gr. 0·964 at 20°, which solidified to the consistence of butter at 0°, in consequence of it containing a fat acid melting at 61° C. The boiling point of the oil was between 195° and 310°. It had an unusually powerful aromatic odour, and it is thought it might be suitable for making "Benedictine" and "Chartreuse," for which purpose the herb is said to be used in France.

Bear-root Oil.—Distillate of the root of *Meum anthamanticum*, Jaq. 100 kilos of the dried root of commerce gave 670 grams of a dark yellow essential oil, the odour of which much resembled that of lovage. Sp. gr. at 21° 0·999. It commenced to boil at 170°, but the temperature mounted to above 300°, when a green-blue fraction passed over, having a celery odour.

Carlina Root Oil.—Distillate of the root of *Carlina acaulis*. From 100 kilos of dried root was obtained 2 kilos of an essential oil having a heavy narcotic odour, of which one-half boiled between 265° and 300°, when decomposition commenced; the remainder resinified. Sp. gr. 1·030 at 18°. This oil is recommended as worthy of a scientific investigation.

Muscatel Sage Oil.—Distillate of the herb and flowers of *Salvia sclarea*, the so-called "muscatel sage," a plant growing wild in Southern Europe and the east, and cultivated in South Germany. The oil has the characteristic spicy odour and taste of the herb. The yield amounts to only one-fifth per cent., and probably the cost of its production would be too high to allow of it coming into practical use.

Onion Oil.—The pure essential oil of the common onion (*Allium Cepa*). About 5000 kilos of onions yielded 233 grams of a red-brown oil, sp. gr. 1·036 at 190°. The small yield leads to the presumption that during distillation a loss occurs through decomposition. On the other hand, as the onion consists of 90 per cent. of water and only 10 per cent. of solid substance, the result from this point of view appears less unfavourable.

The following distillates have been received from Japan:—

Hinoki Oil.—The essential oil from *Retinospora obtusa*, a plant occurring frequently in Japan, resembling savin or thuja oil in odour. Probably without practical value. The low boiling point of this oil is remarkable: about one-half of its volume passes over between 110° and 160° C. and the remainder between 160° and 210°.

Kuro-moji Oil.—Essential oil from the leaves of *Lindera sericea*, Bl., a Lauraceous shrub widely distributed in Japan. The oil has a very fine aromatic balsamic odour, and might, it is thought, find use in perfumery, especially as it is not expensive. Sp. gr. 0·901 at 18°. A sample separated by distillation into three fractions gave (1) between 180° and 200°, a fraction having the agreeable odour of myrtle and coriander; (2) boiling between 200° and 220°, a fraction with an agreeable balsamic odour, recalling somewhat lign-aloe oil, but finer and more fragrant; (3) boiling between 220° and 240°, a fraction resembling the carvol contained in curled mint.

Coumarin.—The following list of plants in which the presence of coumarin has been detected, is quoted from a communication by H. Lojander upon the distribution of coumarin in the vegetable kingdom:—

Orders.	Genera and species.	Part of plant.
Filices	*Adiantum pedatum*	Plant.
	A. peruvianum	Plant.
	A. trapeziforme	Plant.
Palmæ	*Phœnix dactylifera*	The date.
Gramineæ	*Anthoxanthum odoratum*	Flowers.
	Cinna arundinacea	Plant.
	Hierochloa alpina	Plant.
	H. australis	Plant.
	H. borealis	Rhizome.
	Milium effusum	Plant.
Orchidaceæ.	*Aceras anthropophora.*	Plant.
	Angræcum fragrans	Leaves.
	Nigritella angustifolia	Plant.
	Orchis fusca	Plant.
Caryophyllac.	*Herniaria glabra*	Plant.
Rutaceæ.	*Ruta graveolens.*	Plant.
Papilionaceæ	*Dipterix odorata*	Ripe seed.
	D. oppositifolia	Ripe seed.
	D. Pteropus	Ripe seed.
	Melilotus albus	Flowers and plant.
	M. altissimus.	Flowers and plant.
	M. hamatus	Flowers and plant.
	M. leucanthus	Flowers and plant.
	M. officinalis	Flowers and plant.
Cassiaceæ	*Toluifera balsamum*	Fruit.
Apocynaceæ	*Alyxia stellata*	Bart.
Rubiaceæ	*Asperula odorata*	Plant.
	Galium triflorum	Plant.
	Liatris odoratissima	Plant.
	L. spicata	Plant.

In addition, Molisch and Zeisel have reported the occurrence of coumarin in *Ageratum mexicanum*, Sims. This plant, when dry, smells of coumarin, of which it yielded 0·06 per cent.; but when in the fresh condition, has quite another odour, probably derived from an essential oil.

Thymol.—Reference is made to the occurrence in commerce of thymol containing thymene, which can be recognized by its odour, or by the oil stain left upon pressing a fragment between blotting-paper. The following method is given for its more exact determination. Pure thymol dissolves clear in five times its weight of 10 per cent. soda solution when heated to 30° or 40° C., the solution being colourless or faintly reddish, but darkening upon standing. If the thymol contains thymene it gives a more or less turbid solution, from which the thymene separates in the form of oil drops.

Musk.—The following information as to the manner in which musk comes into commerce is quoted from a report by the German consul at Shanghai. "The article comes into the market here in simple wood cases of 9 to 14 catties. Every parcel contains a number of adulterated pods, which have also to be bought. The parcels are then, as a rule, broken up by the exporter and sorted for the London market. On the average they give about 50 to 55 per cent. of "pile I," a fine thin-skinned article; 20 to 30 per cent. of "pile I. and II.," partially or entirely falsified pods; and 20 to 25 per cent. of skin refuse and loss of weight. The sophistication consists of earth, rasped wood, and small pieces of leather or skin, which are inserted in the pods after the musk has been removed. Less frequently the sophistication is effected with lead, heavy pieces of flesh, or paper inserted between the thin inner and thick outer skin, which can only be discovered upon cutting it. In the last year or two the adulteration has gone up to 80 per cent., but in the absence of better qualities, even such an article has found buyers.

CURING VANILLA.*

The process of curing vanilla in Mexico, a writer in the San Francisco *Chronicle* says, is a delicate one, requiring, as it does, not merely drying, but that the pods shall retain certain softness, that they shall lose little in weight, that they shall develop all possible fragrance, and that the active principle shall be brought out to coat the surface in the form of crystals, producing the effect familiarly known as "the silvering of the vanilla." For these purposes, the pods are spread in layers upon gratings of sticks or twigs, arranged in tiers for convenience of inspection. These gratings are arranged in an ample room, dry and well-ventilated. After twenty-four hours, the pods are picked over, and the green and the damaged rejected. If any show signs of opening, they are gently rubbed between the fingers wet in castor oil. The following day the pods are placed in the sun, spread upon dark-coloured blankets. Before sunset, they must be collected and stowed in a box or case wrapped in a blanket previously well sunned to expel possible dampness, and the pods carefully arranged in layers to preserve them in good shape. If this manipulation be properly conducted, the vanilla takes on, in sixteen or twenty hours, a very dark brown colour. It is again placed in the sun, if the weather be fine; if not, spread on the gratings. This process is followed for from twenty to thirty days, which is the time necessary for crystallization to take place, and during which it is sweated three or four times. If the weather be bad during the first important days of curing, or if the crop be very large, ovens are employed for drying, with a temperature ranging from 95° to 120°. For ovening, five hundred or six hundred capsules of vanilla are wrapped in a blanket, then in a petate or rush mat, and securely corded. The vanilla is left in the oven eighteen or twenty hours, as determined by inspection. The ovening must be followed by twenty or thirty days of sunning and sweating, as in sun-curing. These processes over, the vanilla is assorted by grades, tied up in bundles of fifty pods each, and packed for shipping in tin cans or cases not dissimilar to coal-oil cans, and, I shrewdly suspect, evolved from that article.

* From the *American Druggist*, March.

SELECTIVE CHEMICAL AFFINITY.*

BY N. BEKETOFF.

Chemical affinity, since the time of Newton, has been regarded by some as a manifestation of universal gravitation or as an inclination of matter to aggregation; by others, as a peculiar power of affinity, analogous to magnetic or electrical attraction, since it is selective, or behaves differently with different particles of matter. The author regards affinity not as a peculiar force, but as a peculiar manifestation of energy. As a typical example, take a mixture of different halogens and of alkali metals. The result will be the formation of alkali haloïds, that is, compounds of the halogens with the alkali metals, accompanied by development of heat, and not a combination of the halogens or of the metals among themselves, which would take place without appreciable development of heat. Moreover, an apparent change of volume and loss of the original properties of the substances takes place in the first case, but would not do so in the second. This instance of aggregation is at first sight different from the phenomena of gravitation, cohesion, or adhesion. An analogous case would occur if the motion of planets round the sun were arrested, when they would fall into the sun, with development of heat; but if their original motion could be restored to them, the former state might be re-established. Something analogous takes place in the case of phenomena of selective affinity. The atoms may be assumed as gifted with a store of energy, for example, in the form of vortex motions. This motion hinders their close approach or union, which would result in the formation of chemical compounds; it is a repulsive force acting against aggregation. In order to unite, the atoms must lose this motion partly or entirely, but the energy cannot be taken away, even at the temperature of absolute zero, as seen from the fact that the product of heat capacity c and absolute temperature T, that is Tc, is only a part of the heat set free on combination. The only thing that is capable of taking away or annihilating this motion is the action of an element of opposite properties; then chemical combination ensues. An analogous case occurs when two masses moving in opposite directions meet each other. The author assumes that atoms of different elements are gifted with motions, different in form, velocity and quantity, and that these dynamical attributes are greatest for elements placed at opposite ends of periods when arranged according to the natural system as represented by the periodic law. Atoms of the same element may combine to form a molecule comparatively stable towards physical influences, but this stability vanishes when an element of opposite properties enters the sphere of motion. The two opposite motions neutralize one another, and a new, more stable system, that is, a chemical combination, is formed, with a loss of energy. According to this view, the phenomena of selective affinity becomes intelligible, and it is seen that chemical affinity is different from the usual forms of attraction between masses and particles.

If we do not assume the *hypothesis of opposite*

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motions, the masses and particles of bodies might be expected to show the same inclination for combining, so that the most stable aggregates would be formed from atoms and molecules of identical and homogeneous substances. It is true that combination of identical or like atoms takes place comparatively easily, but the compounds formed, chloride of bromine, for example, or alloys, show no *chemical* change in their original properties, and their stability is physical merely, and not chemical.

The author shows that the proposed hypothesis is in complete accordance with the thermal phenomena and with the change of volume accompanying chemical processes. The following tables, I. and II., show for many others that a great contraction corresponds with, and, in the case of nearly related elements, is even proportional to, the development of heat.

Table I.

Compounds.	Contraction per cent. Cl.	Heat of formation. Cl.	Contraction per cent. Br.	Heat of formation. Br.	Contraction per cent. I.	Heat of formation. I.
K	48·4	105·6	38·0	95·3	24·0	80·0
Na	46·0	97·7	30·0	85·7	12·3	69·0
Li	45·7	93·8	—	—	—	61·0
Ba	40·0	97·0	22·0	85·0	—	—
Ca	35·7	85·0	—	—	—	—
Pb	32·0	41·3	21·0	32·2	8·0	20·0
Ag	30·8	29·3	20·7	22·7	—	13·8

Table II.

Compounds.	Contraction per cent.	Heat of formation.
MgO	62·0	149·0
Li_2O	61·4	140·0
CuO	60·0	131·0
Na_2O	58·0	100·0
ZnO	47·0	85·0
PbO	31·0	55·0
BaO	40·3—47·7	124·0
Cu_2O	22·0	40·8

Table III.

Compounds.	Contraction per cent.	Heat of formation.
NaI + Cl = NaCl + I	23·5	28·7
KI + Cl = KCl + I	22·8	25·6
NaI + Br = NaBr + I	13·0	16·7
NaBr + Cl = NaCl + Br	13·4	12·0
KBr + Cl = KCl + Br	10·0	10·3
AgBr + Cl = AgCl + Br	6·9	6·6

The same may be seen from Table III., representing phenomena of substitution. It would appear that the hypothesis of reciprocal annihilation of motion in chemical action is in accordance with the phenomena of contraction and of heat. But there is another cause on which the phenomena depend. The author showed, in 1859, that the distribution of the atoms of elements in a given system depends on the relative weight of the atoms acting on each other, and that the distribution proceeds in such a manner that smaller atoms combine with smaller, and larger atoms with larger ones. Such a distribution corresponds with the general inclination of matter to aggregation, and is accompanied by greater condensation and increased development of heat. This is apparent from the phenomena of double decomposition, but not in solutions, as the ± heat of dissolution obscures the phenomena. For whereas in solution the "modulus" expressing the heat of substitution of one element by another is nearly constant (Favre and Silbermann), in the solid state this modulus changes from positive to negative values within wide limits. For example, when oxygen in oxides of alkali metals is displaced by chlorine, the heat developed decreases with decreasing weight of the metal, $\frac{K_2O}{2}+Cl=+57$; $\frac{Na_2O}{2}+Cl=47{\cdot}5$; $\frac{Li_2O}{2}+Cl=23{\cdot}2$. When oxygen is displaced by iodine there is at last a reversion of affinity, $\frac{K_2O}{2}+I=+32$; $\frac{Na_2O}{2}+I=+19$; $\frac{Li_2O}{2}+I=-10$; for in the case of lithium iodide the difference of atomic weights is very great, $\frac{Li=7}{I=127}$, and therefore the heat of formation of the oxide, $\frac{Li=7}{O=8}=70$ Cal., is larger than that of the iodide. Lithium iodide is, therefore, easily decomposed by the oxygen of the air. A reversed action similar to that of oxygen and the halogens is seen in the case of hydrogen compounds; the formation of water, for instance, is accompanied by greater development of heat than that of hydrogen chloride, $H+\frac{O}{2}=29$; $H+Cl=22$; $\frac{H_2O}{2}+Cl=-7$. This difference is much larger for hydrogen bromide and iodide, the relation of the atomic weights $\frac{1}{80}$, $\frac{1}{127}$ being still more unfavourable for saturation than $\frac{1}{35{\cdot}5}$.

The influence of the relative weight of combining atoms or equivalents, in the case of different atomicity, is easily understood from the above point of view. The attraction of material particles increases with decreased distance, and in the same way it increases as the acting masses become larger. Here we have another cause which promotes such a distribution. We can admit that the motions of atoms of nearly equal weight, if they are opposite in direction, will be most likely to completely neutralize each other. In the case of the formation of compounds with absorption of heat, the energy becomes greater, and the endothermic compound formed will be less stable than the molecules of their similar constituents, so that under the influence of chemical or physical agents they will show an inclination to pass readily into more stable systems, in which the atoms possess a smaller store of energy. The physical stability of such compounds will depend mostly on the relative weight of the constituent atoms, that is, on the equal or nearly equal heat capacity.

IMMATURE CUBEBS.

BY C. B. LOWE.

One of the wholesale firms in Philadelphia lately received from a New York importer a sample of what was represented to be cubebs. They are about one-third the size of true cubebs, with a stipe about one-third longer than their diameter, are of a dark purple colour, quite shrunken appearance, and of a cubeb odour, but much weaker taste. On examination with the microscope they are seen to contain numerous oil cells in the mesocarp, but the layer of stone cells which forms the endocarp in the true cubebs can not be discerned. They contain a very rudimentary seed. In my opinion they are cubebs which have been picked while quite immature, the present high price of cubebs, probably, having tempted the growers to put them upon the market in this condition.—*Amer. Journ. Phar.*

ALUMINIUM IN VASCULAR CRYPTOGAMS.

In a paper contributed to the Royal Society, Prof. A. H. Church states that aluminium is a constant constituent of the ash of some species of *Lycopodium*, while it appears to be entirely wanting in others. The following genera gave negative results:—*Equisetum*, *Ophioglossum*, *Salvinia*, *Marsilea*, *Psilotum*, and *Selaginella*. Among Filices it was found only among tree-ferns, one species yielding as much as 13 p. c. of the ash. The alumina in *Lycopodium* occurs in combination with organic acids, and may serve to neutralize the acids produced in the plant.

The Pharmaceutical Journal.

SATURDAY, APRIL 20, 1889.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE RESEARCH LABORATORY AND THE ANTI-VIVISECTION SOCIETY.

THE report of the Research Committee on the work done during the past year in the laboratory of the Pharmaceutical Society, which was published in this Journal a few weeks since, has been turned to a most extraordinary purpose by a Society which claims the function of protecting animals from vivisection. According to a circular which has been sent to the members of the Pharmaceutical Society, it is stated that the establishment of the Research Laboratory has been undertaken "apparently with the object of promoting experiments with drugs on animals," and though it is not shown on what foundation this strange assumption has been arrived at, the circular proceeds to solicit the co-operation of members of the Society in opposition to the further continuance of the research work in the Society's laboratories. It is pointed out that the election of two-thirds of the Council for the ensuing year is about to take place and that a favourable opportunity will thus be offered for an attempt to interfere with the work of the Society in promoting research. In order to carry out this project a fly-sheet is attached to the circular, with a printed form which members of the Society are requested to sign, expressing their determination not to vote for any candidate for the Council who does not oppose the scheme of research which is supposed to have the object of promoting experiments with drugs on animals.

It is difficult to decide whether the ignorance betrayed in this totally gratuitous assumption is more amazing than the impudence of the attempt to interfere with the affairs of a Society with which the persons issuing this circular have no kind of concern, and as we understand that the circular has been very widely distributed among the members of the Society it becomes necessary to characterise this as a most unwarrantable proceeding. That such is the case most of our readers who have taken an interest in the research work lately inaugurated by the Council will at once perceive; but in the case of those who might be misled by the statements, and, we may add, the suggested misrepresentation, of the circular above mentioned, it will only be necessary to refer them to the report of the Research Committee at page 733 of the Journal, and to the several papers therein enumerated as having been so far the result of the work carried out in this new department. It will there be seen that the representations in the circular are destitute of any foundation whatever, in regard to the investigations carried out in the laboratories of the Pharmaceutical Society.

On the 23rd ult. the royal assent was given to a law to amend the Ontario Pharmacy Act, one or two points in which are worthy of noticing just now, as bearing upon the educational legislation for which the Pharmaceutical Society is seeking in this country. Under the Ontario Act of 1884 it was only necessary for a candidate, before presenting himself for the qualifying examination, to satisfy the Council of the Ontario College of Pharmacy that he had served as an apprentice to a regularly qualified pharmaceutical chemist for a term of not less than three years. Under the amended law the requirements are much more stringent. The apprenticeship required is now increased to four years, and, in addition, the candidate will have to show that he has attended two courses of lectures, the first in any college of pharmacy or school of medicine approved by the Council, and the second at the Ontario College of Pharmacy, such courses to include pharmacy, chemistry, materia medica, botany and reading and dispensing prescriptions. Power is also given to the Council to fix and determine, from time to time, a curriculum of studies to be pursued by the students. Before the term of any apprenticeship will commence to run for the purposes of the Act the embryo candidate will have to lodge with the registrar a certificate that he passed a satisfactory examination in (1) arithmetic and mensuration, including reduction, simple and compound proportion, vulgar and decimal fractions, square root, areas of rectilineal figures and volumes of right parellelopipeds; (2) in algebra, including elementary rules, greatest common measure, least common multiple, fractions and simple equations of one unknown quantity; (3) in political, physical, and mathematical geography; and (4) in English grammar and composition. It is provided, however, that any time occupied in attending the first course of lectures may count as part of the apprenticeship. According to a Dominion contemporary a question was raised in the Ontario Legislative Assembly, during the discussion in committee of the Bill, as to what was meant by the "volume of right parallelopipeds," but as the Provincial Secretary "gave it up," and the Minister of Education refused to commit himself, the Committee left the mystery untouched. Another novelty in the Bill is that it gives the Council power, should it think it desirable at any time, to pass a bye-law, subject to the assent of the Lieutenant-Governor, dividing the province into thirteen "electoral territorial divisions for the purposes of the Act," after which the resident duly qualified members of the College in each division,—and under the 1884 Act every registered chemist and druggist in the province is *ipso facto* a member of the College, paying to its funds four dollars annually,—would have the right

to elect from among themselves one of the thirteen members of Council. Lastly, the new Act removes from the second part of the schedule "carbolic acid" and "chloral hydrate," and places them in the first part, together with "cocaine and its preparations," inserted in the schedule for the first time.

* * *

In the recently issued report of the Medical Officer to the Local Government Board, Dr. Buchanan calls attention to some investigations that have been made as to the water supplies of Sheffield and other large towns, where the water has proved to possess a power of dissolving the lead of the delivery pipes that has resulted in cases of lead poisoning among the consumers. At Sheffield, a soft moorland water, delivered for more than half a century without suspicion of deleterious action by it on lead, suddenly, in 1885, caused so much lead poisoning among the consumers of it as to arrest the attention of the Medical Officer of Health, Dr. White. It appears that the water was supplied from two reservoirs, getting their water from separate moorland gathering grounds, and the cases of lead poisoning were associated almost exclusively with the water from one of these supplying the high district. This water was found to be distinctly acid, whilst that from the low-level reservoir was only faintly so, and the same difference marked the waters in the streams tributary to the reservoirs, the high-level streams being more acid the nearer their source. Dr. White found that both the lead and the acid dissolving it could be removed by filtration, or that on the large scale the water could be deprived of its solvent action on lead by keeping it for a few hours in contact with fragments of freshly-broken Derbyshire limestone. But the source of the acid was not cleared up, nor even its identity proved, since while some chemists looked upon it as sulphuric acid of pyritic origin, others thought humic or ulmic acid quite as probable. At present nothing has been ascertained as to the way in which a water may be prevented from acquiring this "plumbo-solvency," or under what conditions the property is lost by a water, as is known sometimes to be the case. For instance, the soft water of Loch Katrine, when taken at the lake, is found to exercise a very vigorous and sustained action on lead, whereas the same water, as delivered in Glasgow, exercises a very insignificant action on lead pipes, so that lead-poisoning through the water-supply is unknown at Glasgow. Indeed, the Loch Katrine water has been ascertained to lose its "plumbo-solvent" property after it has flowed a few miles from the lake by its natural outlet. But the causes of this change, upon which the health of Glasgow would, to some extent, appear to depend, are at present obscure. Mr. Power, who has had the subject under investigation, raises the question whether this seemingly inscrutable behaviour of soft moorland waters in regard of "plumbo-solvent" ability may not be related to the agency, direct or indirect, of low forms of organic life, and he suggests that the point should be subjected to the test of direct experiment in the biological laboratory.

* * *

The report of the Director of the Royal Botanic Gardens in Ceylon for the year 1888, contains as usual a number of interesting notes on economic vegetable products of the island. Among these tea now seems to take the leading place, the commercial year 1887-8 showing an export of 20,755,779 pounds, being an increase of 8¾ million pounds over the previous year. The average price obtained for the Ceylon tea sold in London during the year was 11½*d.*, but with a tendency to decline. The export of coffee in the same time dwindled to 136,265 hundredweights, and the area under cultivation with the plant is still decreasing. The year's export of cinchona bark was also less by nearly three million pounds, but it nevertheless amounted to the enormous quantity of 11,704,932 pounds. Two plants, believed to be of *Remijia pedunculata*, the quinine-yielding "cuprea" bark, received from Kew, are doing well at Henaratgoda and Peradeniya, but some plants of *Remijia Purdieana* received have died. The Para rubber plantation at Henaratgoda is doing well, consisting mostly of fine trees, the largest being five feet in circumference at a yard from the ground. A crop of over twenty thousand seeds ripened between July and September, and one thousand of these have been sown in Wardian cases and sent for experiment to other stations. One tree, eleven years old, was tapped at three different periods and yielded altogether 1 lb. 12¾ ozs. of good dry rubber, without appearing the worse for the operation. This is considered to indicate that at present prices a large profit could be made out of a *Hevea* plantation in Ceylon. The gutta trees are also making progress, and Dr. Trimen urges that to neglect now to make forest plantations of these trees is to forego a large prospective revenue when the natural sources of gutta percha are definitely exhausted. All efforts to introduce the true cubebs plant (*Piper Cubeba*) into the island have remained unsuccessful, none of the seeds received from Eastern Java having germinated. The cultivation of the pepper plant is said to be commencing on a considerable scale, and it is pointed out that much more might be done in the production of nutmegs, cloves and vanilla. At Henaratgoda, also, a larger plantation of ipecacuanha has been formed, the plants being over two and a half feet high at the end of the year and root formation proceeding rapidly.

* * *

We have been favoured by the Registrar of the General Medical Council with copies of the Medical Register and the Dentists' Register for the current year. From the statistics prefixed to the Medical Register, it appears that the total number of names contained in it is 27,939, being an increase of 693 names on the previous year, the registrations during the twelve months having numbered 1184, the restorations 99, and the removals 590. The total number of names on the Dentists' Register is 4890, showing a decrease of 9.

* * *

The Annual General Meeting of the Chemists Assistants' Association will be held on Thursday, May 2, when the Association Prize Essay will be read by the successful candidate.

* * *

The next meeting of the School of Pharmacy Students' Association will be held on Thursday, April 25, when Mr. R. Harding Bremridge will read a paper on "Combustion in Moist and Dry Oxygen," and Mr. F. C. J. Bird will give a Report on Practical Pharmacy.

Transactions of the Pharmaceutical Society.

EVENING MEETING IN EDINBURGH.

The fifth evening meeting in Edinburgh of the present session was held in the Society's House, 36, York Place, on Tuesday, April 9, at 8.30, Mr. William Gilmour, F.R.S.E., in the chair.

The minutes of last meeting having been read and adopted, the following communications were read:—

Note on Methyl-Orange.

BY D. B. DOTT, F.R.S.E., F.I.C.

Dimethyl-aniline-orange was introduced some years since as an indication in alkalimetry, and seems to have taken a permanent place among that class of bodies. Its principal advantage consists in its not being affected by carbonic acid, litmus and phenolphthalein being both acted on by carbonic acid, so that in the titration of carbonates, boiling of the solution is avoided, and greater accuracy obtained. On the other hand, it is a poor indicator for organic acids, and not very satisfactory with phosphoric acid, the end reaction not being sharply defined. What I wish now to note is that these inherent defects may be magnified and added to by the use of an inferior preparation which is sometimes supplied. The defective sample is darker in colour and has a stronger odour than the good sample. The difference between the substances will be best shown by giving the actual estimation of a sample of sodium carbonate in which both kinds of methyl-orange were used as indicator.

1·970 gram sodium carbonate (10-hydrate) was dissolved in water and solution diluted to 250 c.c. Of this solution two measured portions of 25 c.c. were titrated with decinormal sulphuric acid, methyl-orange (genuine) being used as indicator. There were required of acid to neutralize *a* 13·3 c.c., and *b* 13·3 c.c.

$$\cdot0143 \times 13\cdot3 = \cdot190. \quad \cdot190 \times 10 = 1\cdot90.$$

$$1\cdot970 : 1\cdot900 : : 100 : 96\cdot44.$$

When, now, 25 c.c. of the same solution were similarly titrated, but the defective methyl-orange employed, the end reaction was quite indistinct. An approximation to the acid tint was obtained by the addition of 16·3 c.c. of standard acid, but there was no decided red coloration until about 23 c.c. had been added. It is obvious that the use of such an indicator might lead to very erroneous results, especially if it were not quite so bad as the sample in question, and therefore not so readily suspected. It would be well in any case of doubt to compare with our old, and perhaps too-much despised friend litmus, which is not likely to be far wrong. My own feeling is very much this: that litmus is litmus, while methyl-orange may be rather a doubtful quantity, just as there are certainly many who would take quinine or sugar with confidence, but would have a shade of suspicion regarding antipyrin or saccharine.

Dr. Inglis Clark said he could quite confirm the statements made by Mr. Dott, and on the whole he was inclined to think that litmus, though it had disadvantages, was the best and most reliable indicator.

Mr. Hill said he had found in some recent estimations that results obtained by using phenol-phthalein as indicator differed from those obtained by using litmus, and the latter he considered most reliable.

Mr. Boa said he had been much interested in this note, which was very useful as pointing out that commercial "methyl-orange" was not always the same thing.

Mr. Gibson had found that certain results could not always be obtained by using methyl-orange, which was one thing at one time and another at another, and he had given it up in favour of litmus.

Action of Tartaric Acid on Mercuric Chloride.

BY D. B. DOTT, F.I.C., F.R.S.E.

The paper is printed at p. 841, and gave rise to the following discussion:—

Mr. Arthur said he had had some experience of this antiseptic. It had been suggested by an American writer, and he prepared a 1 in 2000 solution for one of the surgeons in the Royal Infirmary. Gauze and other dressings were prepared at the same time. It was used for dressing a wound in an operation, and on examining the dressings next day the surgeon was surprised and rather alarmed to find the wound filled with what appeared to be black clotted blood. He at first suspected that by some mistake a large vein had been cut, but an examination showed that this was not so, and that the suspicious appearance was due to the new antiseptic. Probably the mercuric chloride was first reduced to mercurous chloride, and this coming in contact with the alkali of the blood was ultimately reduced to oxide, and thereby rendered quite inert. The result was that the use of such a solution was abandoned.

Mr. Lunan said he had had considerable experience of this solution and also of the compression of pellets of corrosive sublimate, and he had observed that some decomposition took place. He found that it did not occur in a strong solution, but in a dilute solution the precipitate formed after a time. Such solutions were mostly used in obstetric practice; they were generally freshly made, and, being cheap, were usually thrown away. The only effect of the decomposition would be to slightly reduce the antiseptic power of the solution, and as the change only took place on standing, their use would not be much interfered with. At present the solutions made from compressed pellets were very extensively used.

Mr. Duncan asked Mr. Dott if he thought the mercuric chloride was still present as such in the tartaric acid solution, as he found on adding ammonia that the usual white precipitate was not produced.

Mr. Lunan remarked that this was perhaps due to the formation of mercur-ammonium tartrate, which was soluble in water.

Mr. Dott in reply said he quite agreed with Mr. Lunan that the only effect of the reduction would be to weaken the solution. With regard to the precipitate formed he had been led to the conclusion that it was calomel, from the fact that it was insoluble and blackened on adding an alkali. The fact that no precipitate was obtained on the addition of ammonia to the solution of perchloride and tartaric acid did not prove that a previous combination had taken place, and he thought there was no doubt that the mercury was present in the solution as mercuric chloride.

The Chairman said they were much indebted to Mr. Dott for these interesting practical notes, and moved a vote of thanks, which was awarded with acclamation.

Liquor Calcis Saccharatus.

BY CHARLES ARTHUR.

For some time past I have been interested in the subject of the development of colour in liquor calcis saccharatus. You will remember that at an evening meeting here four years ago (*Pharm. Journ.*, vol. xv., 1884–85, page 595), Mr. Rutherford Hill read a communication dealing with this same matter. So far as I have seen, this is the only attempt that has been made to explain the coloration, and suggest a method for preventing it. In that communication it was proved that the coloration was due to oxidation, and might be prevented by excluding the liquor from con-

tact with the atmosphere. It was also suggested that the colour was due to decomposition of the sugar, with production of apoglucic acid, but the author stated that this had not been experimentally proved, but was merely a speculation founded on the known properties of the substances contained in the solution. After giving the decomposition on which the theory is based he concluded that though his explanation might not prove accurate, it might assist in the further elucidation of the subject.

I had the pleasure of hearing the paper read at the time, but did not feel satisfied that the decomposition of the sugar was the true explanation of the colour. On testing a coloured sample of the liquor, iron was found to be present, and the idea at once occurred to me that this was the source of all the difficulty, but I did not at the time make any further investigation.

Recently I have devoted some attention to the subject, and as the result of a large number of experiments I have reached certain conclusions which I think will be useful as a "further elucidation of the subject."

On examining a number of commercial samples of the liquor which had become coloured, iron was found to be present in all of them, and they were all well up to the official standard of lime. The liquor, when tested with potassium ferrocyanide, does not give the usual blue reaction; but on acidifying the solution, preferably with acetic acid, the characteristic iron reaction is at once obtained. It is pretty generally known that commercial lime shell contains varying quantities of iron and manganese, and to determine the proportions of these metals, five samples were obtained from various sources and examined with the following results:

Sample.	Ferric oxide Fe_2O_3 per cent.	Manganic oxide.
A	Absent	Absent.
B	0·6	Trace.
C	8·3	Very distinct.
D	2·4	Trace.
E	1·8	Distinct.

Manganic oxide was present in largest proportion (from 1 to 2 per cent.) in sample C, but I did not consider it worth while to determine it quantitatively with accuracy.

Sample A.—This is the lime I have used for some time. It is prepared from Carrara marble, is of a pure white colour, and entirely free from iron or manganese. I have placed on the table samples of the liquor made from this sample of lime, which have been exposed to air and light for months, and you will see that they give no indication of coloration.

Sample B.—This is a comparatively soft shell and slakes easily. It is a very good commercial sample, and is, I believe, Irish lime. A liquor made from it is of a comparatively pale, yellowish colour, and gives a reaction for iron, though not of the same intensity as most samples.

Sample C.—This, to judge by its blackish brown colour, looks rather a suspicious sample. From the table you will observe that it contains an unusually high percentage of ferric oxide, and this, with the black manganese oxide, doubtless accounts for its deep colour. It slakes readily, however, and gives a liquor calcis saccharatus of full lime strength. The colour of the liquor, you will observe, is of a deep brownish yellow, and it gives a very distinct iron reaction with potassium ferrocyanide, when acidified.

Sample D.—This is very hard, of a reddish-brown colour, and slakes very slowly. It gives a liquor which speedily colours, but is not so deeply tinted as that made from sample C. It comes next to it, however, and gives a distinct iron reaction with potassium ferrocyanide.

Sample E.—This is a soft shell having a somewhat marled appearance and slaking readily. It yields a liquor of a pale yellowish colour, not so deep as that made from sample D, and not more so than that made from sample B. It gives a less distinct iron reaction with potassium ferrocyanide than sample D. This sample differs from all the others in its solubility in hydrochloric acid. The others were almost entirely soluble, but this sample left about 7 per cent. of a pure white powder, which was found to consist mainly of silicate of aluminium.

It is interesting to observe that many samples of lime shell contain oxide of manganese. In a paper read at one of our meetings here Mr. Shand drew attention to the presence of manganese in chlorinated lime (*Pharm. Journ.*, vol. xvii., page 794), and it was suggested that it might have been carried over mechanically from the chlorine generator. Mr. Baker pointed out that the manganese was a constituent of some limestones, and the above results seem to indicate that his explanation of its presence is the correct one.

It will be seen from the samples shown that the depth of colour in the liquor calcis saccharatus is in direct proportion to the percentage of ferric oxide in the lime from which it is prepared, and that where iron is absent no coloration takes place.

As to how the iron gets into solution and in what form it exists in the liquor a large number of experiments have been made, but it is unnecessary to bring these before you in detail. It was found that ordinary liquor calcis made, say, from sample C, is quite free from iron, and it seems quite clear that solution of the iron takes place through the agency of the sugar and the alkaline lime in conjunction. The action seems to be similar to that taking place in the production of the *ferrum oxydatum saccharatum solubile* of the German Pharmacopœia, which is prepared by precipitating a solution of ferric chloride with solution of soda in presence of sugar. In this way a yellowish-brown alkaline powder is obtained containing 3 per cent. of iron, of which 1 part added to 20 parts of water gives a clear reddish-brown coloured solution, which deepens in colour on exposure to air and light. This solution, like liquor calcis saccharatus, also gives no iron reaction with potassium ferrocyanide until it is acidified. The true cause of the coloration in liquor calcis saccharatus is apparently to be explained in the same way. The solution containing iron has very little colour at first, but on exposure to air more highly coloured oxidized compounds of iron are produced, and the iron perhaps passes into the colloidal condition, familiar to us all as the so called "dialysed" iron.

"Dialysed" iron behaves itself in the same manner as the liquor calcis sacch. and ferrum oxid. solubile, when treated with potassium ferrocyanide. The iron in liquor calcis sacch. will not dialyse through a membrane, which proves their close analogy.

From the foregoing experiments and facts it is apparent that the only effectual means of avoiding coloration in liq. calcis saccharatus is to use a lime free from iron, and carrara marble yields such a product. The Pharmacopœia permits the presence of such impurities as iron and manganese in the lime shell to be used in pharmacy. For all other purposes this is not objectionable, as these impurities do not interfere with its use, but in the case of liquor calcis saccharatus this is not so, and I would suggest that lime free from iron should be ordered in the official formula.

Mr. Hill said it was a little disappointing to find one's carefully constructed speculation demolished, but in the interests of truth there was some comfort in letting it go. He had no doubt that Mr. Arthur had now settled the question as to the source of the coloration, and by a fortunate accident he had been able to

confirm what Mr. Arthur had said by an examination of one of the samples shown at the meeting a few years ago at which his note was read. He had that day received from Mr. Thomson a fine sample of Irish lime, which was even purer than the one examined by Mr. Arthur, but even it contained a distinct trace of iron and also gave a faint reaction for manganese. In all the lime samples he had examined he had found that whenever iron was present manganese was also present, and apparently the two always went together. He could quite confirm the statement that the iron in the solution was probably in the colloidal condition. He had placed a quantity of the most highly coloured sample on a dialyser, and after standing for twenty-four hours, although lime and sugar could easily be detected in the solution outside the dialyser, no trace of iron could be found.

Mr. Stephenson said they were much obliged to Mr. Arthur for a satisfactory explanation of this rather puzzling question. The paper amounted to a demonstration that the colour was due to a trace of iron, which was very probably present in the colloidal form.

Mr. Nesbit said he had formerly expressed his agreement with Mr. Hill in saying that the colour might be due to decomposition of the sugar, and he still thought this might to some extent be the case. The peculiar smell which the liquor acquired suggested the presence of some such colouring substance as ulmin. He would like to ask Mr. Arthur if the iron was present in the lime in the ferrous or ferric condition.

Mr. Boa said Mr. Arthur was to be congratulated for having brought this question to a logical conclusion. He had all along had doubts as to the explanation suggested by Mr. Hill being the true one.

Dr. Inglis Clark said he had listened with much pleasure to this communication. It was a synthetical, rather than a theoretical paper, and might be taken as an example of what such papers should be. He did not gather that there was any reason to suppose that the manganese in the lime had anything to do with the coloration.

Mr. Gibson said he believed Mr. Arthur was on the right track, and he quite agreed with the conclusions to which he had come.

Mr. Arthur, in reply, said there could be little doubt that the iron existed in the lime as ferric oxide, and probably passed into solution as ferric sucrate.

Glycerites of Ferrous Salts.

BY CHARLES ARTHUR.

The paper is printed at p. 841, and gave rise to the following discussion :—

Mr. Stephenson said he recollected that about twenty years ago it had been suggested that glycerine should be used in the making of these preparations, but the suggestion did not appear to have been generally adopted and had soon disappeared. It was exceedingly desirable that they should have some means of preventing coloration, and he thought they were much obliged to Mr. Arthur for bringing the matter before them. He must say he had not had much difficulty with the syrup of iodide of iron, since adopting the plan of keeping it in small bottles quite full.

Dr. Inglis Clark said he did not think it was generally known that by precipitating ferrous carbonate in the presence of glycerine a precipitate was obtained containing glycerine, which could be washed and dried. It was of a pale green colour, contained a very small quantity of glycerine, and remained unchanged for months. From experiments made some time ago he could corroborate what had been said by Mr. Arthur as to the great advantages these glycerites possessed over syrups.

The Chairman said one feature of this paper which he rather liked was the fact that the author had given definite working formulæ.

A Simple Arrangement for Rapid Filtration.

BY CHARLES ARTHUR.

This arrangement, which I have had in use in my own laboratory for some time, consists essentially of an ordinary York Glass Company's percolator, to the receiver of which is attached an ordinary exhausting syringe by means of a piece of stout non-collapsible indiarubber tubing. Mr. Hill having seen the arrangement expressed a desire to have it exhibited at an evening meeting, and at his request I have brought it before you to-night. You will observe that an aperture has been made in the shoulder of the receiver, and that the tube connecting with the exhausting syringe is fitted into this aperture by an ordinary indiarubber stopper. In order to steady the exhausting syringe it is fixed to a flat block of wood. In the percolator I have placed some ginger in fine powder, and packed as tightly as it can well be. The percolator is then placed in position, and the joint between it and the receiver made air-tight by running a brush round it with glycerine. I now pour rectified spirit into the percolator, and giving the syringe a few pulls produce a partial vacuum in the receiver. The result is to force the menstruum through the drug, and you will observe that it runs into the receiver in a pretty rapid stream, the operation proceeding much more rapidly than under the ordinary conditions. It is not necessary to stand beside the apparatus and constantly keep up the exhaustion. A few pulls now and again is all that is required, and this can easily be done while attending to other work. Where two or three percolators are in use at one time they could very easily be connected with one another, and the one exhausting syringe would do for the whole series. In the case of alcoholic or ethereal percolates there is a danger of loss of menstruum, and I propose devising some plan of returning the exhaust air from the receiver to the upper portion of the percolator or else of passing the exhaust air through water. To prevent formation of drains in the drug it is necessary to have it very carefully packed, and in addition to this I have thought of trying the plan of putting perforated plates at different levels throughout the packed drugs ; the perforations of one plate alternating with the perforations of the next so as to force the menstruum to take a zigzag course. These additions, however, have still to be worked out. The apparatus as it stands has given much satisfaction in practice, and it is so simple as to be within the reach of any ordinary pharmacist. You will remember that in a paper read at an evening meeting here Mr. Maben suggested a plan for exhausting the receiver by an arrangement founded on the principle of a Sprengel pump, and connected with the ordinary water supply. The disadvantage of his plan is that the apparatus must always be used in proximity to the water supply and the degree of pressure cannot be so readily controlled. By the arrangement I have brought before you the percolation may be conducted in any part of the laboratory, and any desired degree of pressure can be easily obtained.

Mr. Stephenson said the practical illustration which Mr. Arthur had given seemed to prove the value of his method, which he thought was exceedingly simple and clever.

Dr. Inglis Clark said it was pretty well known, from published statements, that he was opposed to the plan of using fine powders in percolation. It was necessary to remember the principle which ought to guide them as to the rate of percolation. The menstruum should be allowed to pass through at the rate at which it could pass through the drug itself, and if it was

attempted to make it go more rapidly the probability was that it would simply pass through between the separate particles and not through their substance. If anyone would like to go more fully into this subject they would find it very clearly explained in a paper by Lloyd, published in the *Pharmaceutical Journal* a few years ago. He was afraid that the rapidity at which percolation took place would be an objection to the plan suggested by Mr. Arthur. It would not likely be applied on the large scale, but on the small scale it might prove useful in many cases. It was not necessary in practice to pack a drug so tightly in a percolator as to interfere with reasonable rapidity in percolation.

Mr. Arthur in replying said this idea had first occurred to him in endeavouring to get rid of the difficulty experienced in the percolation of ipecacuanha root. He had found it to answer very well; percolation was completed in a few hours, and a higher percentage of extract was obtained than by the ordinary slow process. He had used it in the preparation of cinchona extract, using No. 60 powder, and the product was fully up to the pharmacopœial standard.

The Chairman said this was the first occasion on which they had had a communication from Mr. Arthur, and he was sure they all hoped that he might be able to give them many more of equal interest. He moved a hearty vote of thanks, which was awarded with acclamation.

Mr. Stephenson having taken the chair the following communication was read:—

Note on the Colouring Matter in Green Euonymin.

BY W. GILMOUR., F.R.S.E.

This short note is intended to throw some light on a question which has been coming up frequently of late, namely, "What is the colouring principle in green euonymin?" I was induced to take this subject up from rather hastily and confidently asserting that it was not chlorophyll which was produced from the tincture shown by Mr. Thomson at our last meeting. This assertion was made on the spur of the moment from observing the complete abstraction of the colouring matter on the addition of benzol, and also from the peculiar bright, almost bluish-green colour of the solution. Everyone knows who has worked with a chlorophyll solution taken from the fresh plant or from a plant carefully dried that it yields a beautiful olive-green, but this colour was quite unlike the solution obtained from Mr. Thomson's tincture.

I may as well state at this point that the chemistry of chlorophyll is still very incomplete, as also are the decomposing spectra—I mean the spectra produced by decomposing agents. Into these I do not purpose at present to enter further than to say that if anyone cares to begin this kind of investigation (I mean the spectroscopic, which is the only one I have any acquaintance with) he will find very much in contemporaneous literature which is not to be found in the spectroscope, while on the other hand he may find something in the spectroscope which is not to be found in current literature.

Mr. Thomson kindly supplied me with a series of chlorophyll tinctures prepared by himself by extraction with ether and alcohol from both fresh and old chlorophyll yielding plants. The first thing that struck me on examining these was that they did not all correspond with each other; some yielding one spectrum and others yielding one quite different. On comparing the methods by which they had been prepared I noticed what Mr. Thomson had also noticed, namely, that definite solutions yielded always the same spectrum, but that the spectrum changed on being prepared differently. Ultimately, however, I discovered that there had been a decided change in *all the solutions which had been evaporated in a copper pan.* This at once put me on the right track. After many experiments with Mr. Thomson's solutions, and solutions prepared by myself, so as to be assured of identity and strength, I found (1) that the green colouring matter in euonymin *was* chlorophyll; (2) that it was changed from ordinary chlorophyll to the brighter green by the action of copper; (3) that the spectrum was altogether altered by even one or two minutes boiling with pure copper; (4) that no extractive medium such as water, ether, alcohol, benzol, etc., had the least effect on the action of the copper, and lastly, that no medium in which I could digest the chlorophyll solution, such as acids, alkalies, oxidizing agents, or any other ordinary agent which I could think of affected the spectrum in the same manner. I may state here that I have tried three samples of green euonymin, obtained from different sources, and all distinctive in their characteristics. I have compared them, not only with Mr. Thomson's samples, but with many prepared by myself, and in every case I have got the same results. I have here two samples of my own preparation, of the same strength and from the same solution in the spectroscope, the one being unaltered and the other acted upon by pure copper. By means of the extra external prism I can superimpose the one spectrum over the other, and you will at once see the decided change which has taken place. I have here also two samples from the same solution prepared by Mr. Thomson, which I will now send round, and the altered appearance of the one acted upon by the copper will be at once apparent to the naked eye on comparing it with the original solution. It may be interesting to note here that the reaction of the spectroscope is so delicate that if we take the refracting index of the first and principal dark band of unchanged chlorophyll, as shown in my spectroscope as 80·20°, the changed chlorophyll acted upon by copper only changes to 80·25°, a difference so small that it requires a magnifying glass, as you observe, to read the vernier, and yet in the spectrum it is very decided, and as convincing as any chemical test which could possibly be adopted.

It was my intention to have stopped here, but there came suddenly into my mind a paper read eight or ten years ago by Dr. Paul and Mr. Kingzett before the Pharmaceutical Conference, on the "Presence of Copper in Preserved Peas," and the thought at once struck me that here we had the explanation of the bright green colour imparted to the peas. It was not so much the colour imparted by the small amount of sulphate of copper added to the preserved peas—this amount being infinitesimal—as the action of the copper upon the colouring matter or chlorophyll. To test this I got solutions of preserved green peas, destitute of copper, and digested with pure copper, and the result was exactly the same as in the case of the chlorophyll copper digested spectrum. I have here two solutions (aqueous), the one filtered from preserved peas, and the other, the same solution, digested with pure copper, and you will notice that the two solutions are entirely different, the one being almost colourless, and the other assuming the bright green colour of the copper-treated solutions already referred to and shown.

You will quite understand that I have treated this matter from the standpoint of the action of copper upon chlorophyll. The action of chlorophyll upon copper may probably form the subject of some future paper, if I find any results in investigating this other side of the subject sufficiently important to notice.

Mr. Thomson said he had examined the ash of the euonymin sample for metals, and on passing sulphuretted hydrogen through a solution a brown coloration was produced. The quantity of metal pre-

sent was too small for detection by any of the usual tests, but from the colour he suspected that it was copper. He mixed a little chlorophyll with castor oil (which he thought was probably the oil he found in the euonymin sample) and boiled them in a copper vessel. In a short time the chlorophyll changed to a beautiful blue-green, exactly like the colouring matter of the euonymin sample. Repeating the same experiment in a platinum vessel no change took place, but on adding a minute quantity of alkaline solution of copper the characteristic blue-green colour was at once produced. On testing the chlorophyll which had been boiled in a copper vessel no trace of the metal could be found; in this respect corresponding with the euonymin colouring. The pure chlorophyll he found to be decidedly acid, and he thought this might account for its action on the copper vessel, although the quantity dissolved was apparently too small to be detected by any ordinary test. Mr. Gilmour had kindly submitted the samples to a spectroscopic examination, and the results appeared to confirm the theory that the colouring matter was chlorophyll altered by contact with copper.

Mr. Hill said since last meeting a good deal of work had been done in endeavouring to determine the nature of the colouring agent in the samples of green euonymin, which had given rise to so much discussion, and he thought Mr. Gilmour had brought the question to a definite conclusion. With regard to the blue particles which, as mentioned at last meeting, he had found in the sample, he found they were bleached by oxidizing agents, and he had no doubt now that they consisted of indigo. The object in adding indigo seemed to be to still further heighten the blue-green colour of the sample. Like Mr. Thomson, he had failed to find copper in the sample he examined, but it might be present in minute quantity.

Mr. Stephenson said he had much pleasure in moving a vote of thanks to Mr. Gilmour, not only for this interesting communication, but also for the excellent manner in which he had discharged the duties of Chairmanship during the session of which this was the concluding meeting.

The vote of thanks having been awarded with acclamation, Mr. Gilmour suitably replied, and expressed the pleasure he had given him to preside at the various meetings they had had.

Attention was directed to the following donations to the Museum:—

Specimen of *Lathræa squamaria*.
From Mr. CHARLES ARTHUR, Royal Infirmary.
Specimen of *Uralium*, a new hypnotic.
From Messrs. DUNCAN, FLOCKHART and Co., Edinburgh.

The Assistant Secretary stated that the latter was a definite chemical compound of chloral and urethane. It differed from both its constituents in being sparingly soluble in water, and this would probably give it some advantages over the very soluble substances entering into its composition.

The Chairman moved a vote of thanks to the donors, which was cordially awarded, and the meeting then closed.

EXAMINATIONS IN LONDON.

April 9, 10, 11, 12, 16 *and* 17, 1889.

Present on the 9*th*—Mr. Carteighe, President; Mr. Bottle, Vice-President; Messrs. Blunt, Bowen, Corder, Druce, Fletcher, Gale, Gerrard, Greenish, Ransom, Saul, Symons, Tanner and Taylor.

Present on the 10th, 11th, 12th, 16th and 17th—Mr. Carteighe, President; Mr. Bottle, Vice-President; Messrs. Blunt, Bowen, Corder, Druce, Fletcher, Gale, Gerrard, Greenish, Ransom, Saul, Symons, Tanner, Taylor and Thresh.

Dr. Stevenson attended on the 9th, 10th and 12th, on behalf of the Privy Council.

MAJOR EXAMINATION.

9*th*.—*Three* candidates were examined. *One* failed. The undermentioned *two* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Arden, Lawrence ....Bourne.
Austin, William Hosking .....Devonport.

10*th*.—*Four* candidates were examined. *Two* failed. The undermentioned *two* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Duckworth, Arthur .....Rochdale.
James, William Montford.....Market Drayton.

11*th*.—*Three* candidates were examined. *One* failed. The undermentioned *two* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Johnson, John Robert .....Cambridge.
Ogle, John Henry .....London.

12*th*.—*Four* candidates were examined. *Two* failed. The undermentioned *two* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Rudd, Henry Bulmer.....Bradford.
Surfleet, Arthur George.....Gainsborough.

16*th*.—*Seven* candidates were examined. *Three* failed. The undermentioned *four* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Metcalfe, Arthur Pollard .....Doncaster.
Tregellas, Clifton Pari .....London.
Whitfield, George .....Scarborough.
Woodruff, Thomas .....Stalybridge.

17*th*.—*Seven* candidates were examined. *Four* failed. The undermentioned *three* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Bowden, Francis Henry.....Manchester.
Davies, Robert Higgins.....Dartford.
Hart, Frank .....Bolton.

MINOR EXAMINATION.

9*th*.—*Thirty-one* candidates were examined. *Sixteen* failed. The undermentioned *fifteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Aplin, John Dare .....Colyton.
Ball, John Arthur .....Nottingham.
Bayliff, John Thompson .....Kirkby Lonsdale.
Beach, William Bertram .....Bridport.
Belcher, Robert Brown .....Birmingham.
Bird, Frederick William.....Coventry.
Bourne, Henry Fred .....Louth.
Bowes, Francis Henry .....Whitby.
Brown, Arthur.....Loughborough.
Burnet, George Maxwell .....Ashton.
Cook, Thomas Marsden.....Hindley.
Cussons, John William .....Ossett.
Daily, Dionysius Lees .....London.
Denny, John Harvey .....Woodbridge.
Fuge, Harry Dixon.....Matlock Bath.

10*th*.—*Thirty* candidates were examined. *Eighteen* failed. The undermentioned *twelve* passed, and were declared qualified to be registered as Chemists and Druggists:—

Duncan, William .....Elgin.
Ellerker, Henry .....Ripon.
Enderby, John Edward.....Spalding.
Evans, Joshua William .....Llandyssul.
Feather, Arad ....Pontefract.
Fuller, George Sydney .....Thornton Heath.
Gee, Ernest .....Bath.
Goode, Charles Edward Adams.Tunbridge Wells.
Goodwin, James .....Nuneaton.

Green, Walter Joseph .....Frome.
Hays, Frederick Arthur.....Birmingham.
Hemens, Wilfred Frank.....Hutton.

11*th.* — *Thirty-two* candidates were examined. *Twenty-one* failed. The undermentioned *eleven* passed, and were declared qualified to be registered as Chemists and Druggists :—

Evans, John Watkin Morgan..London.
Hemming, Francis Harry.....Nottingham.
James, John.....Llandilo.
Jeffery, Arthur Harold .....Bridgnorth.
Kershaw, Sam .....Heckmondwike.
Klosz, Sidney Albert .....London.
Lloyd, James Clement .....Lewes.
Longman, Samuel Henry .....Bath.
Norman, Richard Henry .....Cottenham.
Peacock, Henry .....Sunderland.
Wilkes, Thomas James .....London.

12*th.* — *Twenty-eight* candidates were examined. *Seventeen* failed. The undermentioned *eleven* passed, and were declared qualified to be registered as Chemists and Druggists :—

Oldfield, Alexander .....London.
Peirson, Herbert Sidney .....London.
Pugh, Edward Lister.....Leeds.
Rees, Arthur Kilsby ... .Whitland.
Reeve, Walter .....Norwich.
Roberts, Alfred Dean.....Lincoln.
Shipman, Ernest William.....Cheltenham.
Sisson, Edwin .....Carlisle.
Spurr, Herbert Edward.....Leeds.
Stedman, Arthur.....West Malling.
Stonham, Herbert Lovett .....Maidstone.

16*th.*—*Twenty-four* candidates were examined. *Fourteen* failed. The undermentioned *ten* passed, and were declared qualified to be registered as Chemists and Druggists :—

Smith, Albert .....Royston.
Stott, Ernest Lucius .....Sowerby Bridge.
Stroud, Louis Lecomte .....Newport, Salop.
Sykes, John .....Southport.
Thompson, Henry Clarence ...Belford.
Thornley, John Brooks .....London.
Tongue, Albert James .....London.
Wallace, William John .....Plympton.
Webber, Ernest Distin .....Tunbridge Wells.
Wilson, William .....Maryport.

17*th.*—*Twenty-two* candidates were examined. *Thirteen* failed. The undermentioned *nine* passed, and were declared qualified to be registered as Chemists and Druggists :—

Churchyard, Oliver George ...Ipswich.
Haslop, George .....Oldham.
Jones, William Thomas.....Wellington.
Roberts, Weston.....London.
Taylor, Joe Harry .....Blackpool.
Whitehead, John Henry .....Leeds.
Williamson, Thomas Jerman...Nottingham.
Wilson, Wm., Maniland Lewis...Walthamstow.
Woodcock, Bertrand Joseph...Newark.

MODIFIED EXAMINATION.

16*th.*—*One* candidate was examined, but failed to pass.

PRELIMINARY EXAMINATION.

17*th.*—Certificates by approved examining bodies were received from the undermentioned in lieu of the Society's examination :—

Bellamy, George William .....Hoxton.
Boucher, Charles Ernest .....Bristol.
Charter, Thomas.....Stoke Newington.
Dand, Arthur .....Carlisle.
Fletcher, William George.....London.
Fox, Mathew Henry .....Northwich.
Freeman, William Marshall...Birmingham.
Hare, Arthur .....Newcastle on-Tyne.
Hazlitt, Harry Haworth.....Bury.
Jobbins, Edwin .....London.
Morton, Lawrence Knyvett ...Kennington.
Mountain, John Thomas .....Woodbridge.
Pears, Harry William Kilby...Brighton.
Sant, Ernest.....Burslem.
Taylor, Herbert William .....Kensington.
Whitehouse, John Henry .....Bridgnorth.
Willis, Charles John .....St. John's Wood.

SCHOOL OF PHARMACY.

The following are the questions that were set for Examination at the close of the Winter Session in the—

CLASS OF PRACTICAL CHEMISTRY.

PROFESSOR ATTFIELD.

April 2, 1889. *Hours*: 10 *to* 5.

Books and Memoranda permitted.

Standard number of Marks, 100.

1. Name the official substances labelled respectively A, B, C, D, E, F.
2. Report on the purity of the following substances:—
   Alumen Exsiccatum.
   Calamina Præparata.
   Calcii Phosphas.
   Zinci Oxidum.
3. To what extent does the "Sal Volatile" vary from the official alkaline strength?

NOTE.—*Manipulation as well as results will be scrutinized.*

Provincial Transactions.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

At a meeting of the above Society held on Wednesday, the 10th inst., the following paper was read on—

SHEFFIELD PHARMACY AND COMPULSORY EDUCATION.

BY E. R. LEAROYD.

Gentlemen,—Through the courtesy and at the request of your Honorary Secretary, I have been allowed to take the opportunity of saying a few words to you at the close of the monthly meetings for the present session, and it was suggested to me that it might be interesting if for the short time at our disposal we considered the question of Sheffield pharmacy, and its relations to the proposed regulations as to educational matters forming a very important part of a "Pharmacy Act Amendment Bill" now before the House of Commons.

I presume it will be hardly necessary to explain that the subject of education as to its bearing and value to the student as an aid to examination and as fitting him for a successful career, and the value of the examination itself as a test of the solidity and integrity of the teaching to which he has been subject, has for some time past occupied the attention of and been a matter of serious consideration to the members composing the Council of the Pharmaceutical Society.

For years the subject appears to have cropped up with more or less renewed vitality, and has been the cause of discussion of an almost endless character, and as time after time it has been again introduced in the form of amendment, suggestion or resolution, the flood of eloquence which has been poured out on this evidently important question has been almost unparalleled.

Within your recollection a scheme for an improved educational code was submitted by a very able member of the Pharmaceutical Council, and debated with

that remarkable minuteness and lengthy particularity for which the Council is so proverbial. It however proved an abortive undertaking, and the matter rested only to be revived, and again in another and amended form introduced to the consideration of that representative body. This after the usual careful examination and much deliberative and exhaustive discussion was finally adopted, and became in due course embodied in a Bill presented to the legislative assembly of the country in the form of a "Pharmacy Acts Amendment Bill," which after undergoing the usual vicissitudes to which private Bills are so commonly liable is now set down for second reading some time during the coming month.

It will be merely necessary to add that for our purposes this evening it must be understood that our remarks and criticisms apply only to the aspect of the question of pharmacy in its relation to education, and are not intended to refer particularly to the ordinary conditions of business or commercial management, though the two subjects are rather difficult to separate, and both deserve very careful consideration.

It seems to be universally admitted on all sides, from north to south, from east to west, that the chemist has been losing ground for some time now from a business point of view, and by a great many of those personally interested it has been pronounced the fault of the past policy of the Pharmaceutical Society that such a condition of affairs has come about. Certainly, as we shall see further on, the action of the Society has in one respect at least been most badly advised, at the same time I think it is open to very great question whether something having the same result may not have occurred had events framed themselves quite differently, and those who are so often complaining of the hardness of the times, the unlicensed opposition, and the few privileges possessed by the chemist or pharmacist, should in all seriousness ask themselves the question, What would have been the present condition of the trade had there been no action on the part of the Pharmaceutical Society of a conservative tendency? Would the chemist with—as we shall endeavour to show—his very limited opportunities and embarrassed educational advantages, have been able to maintain even the position he now holds without the assistance, small as it has been, of the Pharmaceutical Society? Heavily handicapped as its members unquestionably are, it may possibly occur to some people that had no promptings to a better state of things been given, no earnestly worded persuasions, no encouragements as a mere tradesman dependent on the ordinary rules of commerce for his living, welfare and status, the more active spirits we see around us, relieved from a weight of grave responsibility which is more or less a decided deterrent and has an unmistakable effect in curbing ordinary business enterprise that is of a speculative character, would have in a still more pronounced and emphatic manner taken advantage of the opportunity, and most effectually crushed for ever the struggling and despondent chemist and druggist or pharmacist, who,

"An easy prey to every cruel wind,"

would have ignominiously sunk in the scramble for a pitiful existence.

The condition, educationally speaking, of the Sheffield pharmacist in the past,—and by the word pharmacist I would include all those who of whatever degree had a legitimate right to the dispensing and sale of drugs and medicines as a matter of calling or business,—has been a fair example of what was the case in most of our large manufacturing centres, and would compare very favourably indeed with the condition of things existing in smaller places. The ancient method of apprenticeship in a few cases introduced men of education who aspired to positions of honour in their profession and were sufficiently successful and obtained respect in their calling; but in the great majority of instances the youths who came into the trade were of a class but little removed from mediocrity, respectable, without doubt, but at the same time subject to the enormous drawbacks of deficient educational advantages of a technical nature, as a matter of course, and totally in a scientific sense.

This condition of things really existed for years, and was not considered at all disparaging, and even now I fancy it is the candid opinion of some of the old school that there is a great deal too much made of these new-fangled notions about education. What a lad really requires is to be taught to be industrious and attentive, and if he can be turned out a good business man it is far better than filling his head with scientific problems and all that kind of rubbish.

Anyone, in fact, who could muster a few coloured bottles and manage to pay his rates and taxes could assume the title of chemist or druggist, and it was not at all unusual that the errand boy became promoted to the counter, and in the course of time budded into the full-blown practitioner.

This is not an exaggerated statement, as some of those present must be aware, and it became in consequence and of necessity as a result that a good deal of ignorance and stupidity was exhibited from time to time, so much so that the medical profession gave it as a very strong reason why dispensing should not be entrusted solely to chemists, that "the amount of ignorance and duplicity displayed by those people as a class did not warrant them in entrusting their prescriptions to their somewhat doubtful manipulation." In those days the selfishness of the individual was proverbial, and as a consequence of his constricted mind and somewhat secluded habits, he became the subject of pitiful subterfuges and acts of littleness and meanness which were painfully apparent.

Even as lately as the passing of the Food and Drugs Adulteration Act, no little consternation was felt in some quarters by those who still walked in devious ways, and it was with something like disgust that many a one turned to his shelves and his bottles and thought with bitterness of the enterprising spirit of the times and the halcyon days that had gone for ever.

This feeling also caused the exclusive policy of the Pharmaceutical Society to be regarded with much heartburning, and the great mass of members of the trade viewed with great disfavour any approach to legislative enactment promoted by that Society or adopted by Government, which was at once scouted as a very annoying interference.

However, it would ill become me to refer in any but respectful terms to several of our Sheffield worthies, who, limited as their opportunities had been, yet showed a straightforwardness of character and uprightness of conduct worthy of all imitation. These were the lights in the picture and the pioneers of better times to come, and it is to the kindly interest shown by them that the Sheffield Association has for so many years maintained an existence, weathering the storm, the battle and the breeze.

Yet their numbers could be easily counted, and it has ever been a matter of the greatest solicitude and regret that, do what it would, so little real sympathy and assistance came from the great bulk of the trade of the district.

Something was wanted to stir up the dry bones, and thus it came to pass that in spite of the great opposition and strong feeling it created the Bill of 1868 passed by the House of Commons, realized to a considerable extent in that respect the anticipations of its promoters.

So that since the last Pharmacy Act there seems to be rather more life in the members of the trade than

before. But even yet the hesitancy which characterized the original chemist and druggist (if I may so term him) has not entirely passed away; there still remains a coolness, which is perfectly recognizable, as a sort of silent protest at what is looked upon as interference with the liberty of the subject, and this feeling has for years been a stumbling-block when dealing with questions affecting the education of the rising generation. We have only to look at the attendance at our meetings to find that the older members of the trade are conspicuous by their absence; fortunately, however, there are exceptions, and to those exceptions the local societies are only too much indebted.

There are those also who hold a sort of indefinite creed regarding the Pharmaceutical Society, and are more than half convinced that if the Society takes the responsibility of framing laws, it should bear the burden of expense attending the administration of those laws. Therefore, should compulsory education be enforced, the powers that be should, as a matter of course, in a spirit of something like parental solicitude and guardianship, provide the ways and means, and so such educational arrangements as are required should be organized and sustained free gratis and for nothing—or, at any rate, at only a nominal cost to the recipient. This provision should form part of the scheme, and they are utterly oblivious, or at least regardless of any consideration as to the costly machinery required to establish and maintain a well-appointed school of pharmacy. Fees, they contend, should be merely nominal, so that every lad could readily partake of this fount of knowledge and lave with perfect freedom therein. If the law compels attendance, then the authorities, it is only reasonable to argue, should provide every facility, and that without any tax upon the resources of the student, his parent or master.

Minds so constituted view questions of education with something like distrust, and they will tell you that the policy is wrong which requires a man to put his hand in his pocket to assist in educating those who may very shortly become his opponents. "Times are," they say, "quite hard enough, and there is already quite sufficient competition without offering facilities for a class of men who will probably ere long go far to take the bread and butter out of our mouths."

There may be something in that, and it is a question worth considering, whether or not increased education benefits the pharmacists as a class. I allude, of course, to compulsory education. That the public will enjoy benefit I think there will be no two opinions. But the question may very fairly be asked, "Will compulsory education, with its attendant increase of cost in time and money, prove a source of commensurate remuneration to the bulk of our pharmacists generally. Will there, to put the matter shortly, be a *quid pro quo*?

I have already noticed the difficulty of separating the commercial from the educational aspect of this important question, so I may be excused if I refer for a moment to what is no doubt paramount in many minds, and that is the extreme gravity of the present position.

Taking the past, present, and what we anticipate of the future into consideration, the conclusion is forced upon us that the Pharmaceutical Society is now on its trial. For years past, though offering many and stupid objections and affording only passive assistance, yet the members of the trade in their hearts cannot but have been hoping or at least looking to the Society as their eventual means from emancipation from their many confessed ills and ailments, much as the earnest watcher gazes at the small glimmer of light in a dark horizon, which may possibly develope into a day of brighter and happier times.

Of course there have been complaints on all sides, both loud and deep, some no doubt undeserved, for we are pretty well assured that so far the real powers of the Society are of a very limited character, but also I am afraid in numerous instances not quite without foundation. At any rate, as a rule, there is "no smoke without fire," and the fact that for so long the voice of complaining has been heard in the land is a sort of assurance, if such is required, that there has been not only dissatisfaction but real distress existing in consequence of the action or rather apparent want of action by the ruling power.

What the influence may have been in controlling the usefulness of the Society to the general body is a matter of dispute, but there seems to be no question that the result has been produced in a great measure by a want of firmness or enterprise or combativeness on the part of the Council, in the fear of overstepping its privileges or perhaps offending the members of the medical profession, or otherwise it has played an undecided part in many cases where vigorous and concerted action might be held to be desirable.

This fear of offending or pandering to the active susceptibilities of other professional bodies has been a source of the gravest mischief to the progressive policy of the Society.

The time has now possibly arrived when a more intelligent, liberal and cosmopolitan view is taken of affairs generally, and if the present effort is successful we may perhaps look with confidence to more prosperous times.

Therefore I say the Society is now on its merits; but should the venture fail, instead of being successful, in all probability it will be some years before any further steps can be hoped for of a character sufficiently elevating in tone or progressive in character, so that I feel compelled to say that so far as I, with my limited acquaintance with pharmaceutical affairs, can judge, I think the whole history of the Society as to its external policy is, that it has failed, so far as it has been a failure, by not being sufficiently self-assertive—a very necessary and valuable condition.

But as to the question of compulsory education affording a means of improving the actual returns of the pharmacist in a pecuniary sense, it may be safely left to time to determine. Of one thing we may be quite certain, that with such a condition of things, with increased powers, the Society will gain strength, and if it can only command unity among its members a much better chance will be offered, and no doubt accepted, of furthering the more general interests of the body at large.

If compulsory educational powers become an accomplished fact there is every reason for the greatest hopefulness as to the future of the chemist or pharmacist; but to achieve this, whilst there should be individually an utter abnegation of self in the body politic, there must also be exhibited the most intense earnestness and determination.

But could the tendency to increased education be prevented? I fancy the wave of educational advancement is too general for successful opposition; not only in our own instance, but also universally is this the case. Even our board schools are not satisfied with the three R's, but have their advanced schools, whilst the manufacturing classes are becoming increasingly alive to the importance of establishing technical schools, which must very shortly have a surprising effect when viewed in the light of past experience.

It therefore seems quite clear that this question of increased education is considered as of the utmost importance, even in our industrial and commercial pursuits, and if the chemist is not to be left behind in the race, it may perhaps be allowed that he too must enter the lists and take his share also.

The very fact that technical schools and other helps to education are now shown to be of such grave national importance to our manufacturing and pro-

ducing interests seems to do away at once with any argument the chemist may hold as to the necessity or otherwise of keeping pace with the times, if only from a strictly commercial point of view.

It may be, and indeed is held by some, that our business is in a sort of transition state; neither fish, flesh, fowl, nor good red herring. But a moment's consideration will suggest at once that this is merely the effect of a cause, and that as the education of the people goes on, more and more will the educational requirements of the pharmacist be necessary, and, unless he is content to lag behind, he will require every assistance in keeping abreast with general progress.

Then, again, the question has been asked, "Will increased education benefit the public?" The answer to that is not that it will so much benefit the public as that public requirement will demand it, and that in no undecided or half-handed fashion.

I am surprised that this movement has not taken place long ago, and I can only attribute the delay to the marvellous incapacity shown by the Pharmaceutical Society at the time of the passing of the Act, 1868, when with a self-aggrandizement and want of foresight of a remarkable character it neglected to incorporate the whole body of the trade at that time, and to that one fatal error is now to be attributed many of the unfortunate objections and equally unfortunate delays in the Society's policy and progress.

It has always struck me that the very foundation upon which a noble structure should have been built had been very badly and faultily laid.

As matters stand now the cry is, and has ever been in the past, "Why does not the Pharmaceutical Society do something for us?" invoking the Society like some titular deity, and attributing to it virtues and powers it does not possess. Well, if the whole trade had been incorporated and united as it should have been, a body of sufficient importance would have been created to do something for *itself*; it could perhaps do it now, but lacks that priceless essential *unity*, and so remains at present unfortunately a house divided against itself.

That the Pharmaceutical Society, except as an educational and examining body, is practically, if not entirely, helpless, is a fact, open of course to disproof; but that compulsory education will give it increased importance is equally clear, and so by a side wind, as it were, the whole body will benefit.

Antagonism to the Pharmaceutical Society's educational scheme is not confined to individuals, for whom there may perhaps be some excuse, but is also very noticeable in the journals devoted to the particular interests which are supposed to be inimical to it, and it is with some feeling of regret that we notice the remarks of a very disparaging and pessimistic character applied to the efforts of the Council.

A good deal of allowance may, of course, be made for the editorial policy required in the successful catering for public support, though it may be but another instance of the widespread feeling of dissatisfaction which has its natural outcome in such literary efforts. The worst, however, which may be said of the Pharmaceutical Society is that it appears a sort of grandmotherly assembly, slow and turbid in action, and not sufficiently alive to the requirements of the times in promoting the commercial interests of the trade, and as to matters of education, that this question has become the proverbial "bee in the bonnet," to the exclusion of other topics of a more practically useful nature.

Now whether it is that, as in other cases, freedom from official responsibility confers a licence which enables almost anything to be said in a spirit of opposition, or, on the other hand, we are really to believe that a policy of over-education is being fostered to the detriment of the welfare of the trade at large, had perhaps better be left to the superior judgment of the great mass of those personally interested, but at least we ought to give the Pharmaceutical Council credit for having threshed out the argument with considerable circumstantiality and much patience.

As it has already been shown, it has been a topic of absorbing interest for some time past, and that questions which may be placed under the category of more strictly trade interests have not seemed to occupy the attention of the Council has doubtless been due to the fact that the powers of the Pharmaceutical Society are, as we have already stated, of a decidedly limited kind. May it not therefore be fairly argued that the Council, with what powers it has, has done its best under the circumstances, and in spite of apparently almost reprehensible apathy, or of mistakes which we may be inclined to grumble at, has with, we must repeat, the limited means at its disposal accomplished what it has done in good faith and with the best intentions?

Still I am bound to confess that the Society has laid itself open to adverse criticism by a want of candour, if I may so term it, without meaning any disrespect, in not up to very recent date stating freely how far the powers of the Pharmacy Act allowed it to go, and to this neglect a good deal of the misconception which has arisen is no doubt to be attributed. Had the general bulk of our chemists had clearly placed before them a fair statement of the limited powers enjoyed by the Society, a feeling of interest and support would most probably have been created, which would have had its influence in strengthening the hands of those endeavouring to get further powers, and had the views of the Society in promoting further education been sufficiently explained and shown to mean that its most earnest efforts were being put forward for the general good by the best, and, indeed, only method at its disposal, a new aspect of the question would have arisen which would have elicited the sympathy and appealed to the generous support of all interested.

So far as the discussion might be followed by outsiders, the Council appeared to treat the question of advanced education strictly on its merits, and as no further explanation or confidence was forthcoming it is only natural to suppose that misconception as to the real point at issue might easily arise.

When lately the President of the Pharmaceutical Society came down to Sheffield, you may remember that to the majority of those present it was with a feeling of something approaching to dismay that for probably the first time in this town, at least in answering the question, "Why does not the Society do something?" he showed with a distinctness which was not only very commendable, but also very significant, that the general idea of the powers presumably possessed by the Pharmaceutical Society were of a very misunderstood quantity, and so while appealing to all to "come over and help us," he might very well have added, had the question been fully ripe for reference, "the only means the Pharmaceutical Society, with what powers it has at command, has of bettering the condition of the chemist and druggist is being fully and earnestly used in promoting further education, which, it is believed, will in the immediate future have a marked beneficial effect generally, and will undoubtedly prove a stepping-stone to the attainment of further and lasting powers of a satisfactory character, and that not alone in an educational sense."

Surely we are sufficiently alive to our own interests, and to the exhibition of our most generous instincts, to refrain from hindering a cause which can be shown to hold out promises so fair and reasonable as these.

Again, opposition to compulsory education is not confined to one class only, or to the selfish, ignorant, or careless, but many of those who professedly sympathize with progressional educational effort oppose the movement. It may be from various motives, but

probably more often from the opinion that the time required can be ill spared, or that the expense to be incurred will be too considerable; but this is inevitable, and just as surely will it result in an increasingly advancing grade of men socially coming into the ranks, which it must be admitted can only be correspondingly beneficial.

That the general conditions of business are slowly, but certainly, undergoing alteration is as sure as it is that the glacier moves on its imperceptible but resistless course; but this should not be attributed to the pharmacist alone. He is the exemplar, but the cause is the public requirement, and it is by reason of it principally that the pharmacist of the future will arrive at his advanced position.

Those who take the trouble to carry their minds back for a few years must remember the numberless nostrums and empirical preparations which in many instances formed almost the staple trade of the old chemist and druggist. Where now are they? Vanished like a dream, and now new and improved methods and preparations take their place, and the public are daily becoming better informed as to their various effects, merits or demerits.

So we may take it for granted there is not to be merely a survival of the fittest, but that public necessity will direct the course and the men must arise to walk therein.

This question of public requirement is of every importance, for if we admit its existence we also allow the necessity for advanced and advancing education, and it becomes an important question whether we can attain such with the limited means at present at our disposal or should they be supplemented by some further measures?

So it easily follows that if we admit the necessity, we should be very unwise if we did not adopt the best possible means to approach the end we have in view. Thus having already a compulsory examination, we may fairly ask, "What are the best means?" Some of our friends may advocate proceeding on the old lines, but if this method is to continue it can hardly result in very successful conditions without the assistance of organised and systematic help.

Students in the past have in too many cases been but half or self taught—so far commendable, no doubt—but have just before examination rushed up to town to "cram" a course of training, proved conclusively to be of most unsatisfactory tendencies, looking to the future.

To do away as far as possible with this system of "cramming," and to meet an evident and sufficiently expressed want, provincial schools such as the Sheffield School of Pharmacy have been indicated, and so have become established.

That the system is fairly successful is shown by its students from time to time graduating in a sufficiently satisfactory manner.

If prosperity is attending the very praiseworthy efforts of the founders, supporters, and teachers of these provincial schools, it is merely another proof that such schools are felt to be required, and it may be that it comes to the earnest student as rain to a dry and parched soil, refreshing and germinating and fructifying. Is it, therefore, too much to believe that if the attendance at such lectures is made compulsory, it will but ensure a progress which is sufficiently marked already to prove a means of considerable encouragement even as things now are at the present?

Then again, as the success of our provincial schools depends upon the number of students who enter its classes, so the success, the vitality, nay, the very existence of the Pharmaceutical Society itself depends upon its members, for as so far a purely educational and examining body, with some slight privileges added, its very life is threatened unless it provides sufficient and convenient facilities for its students, and this will require as an absolute necessity the establishment and provision of provincial schools of pharmacy in the various centres. Without such schools, though the central body may be anxious and desirous, nay, may offer every possible inducement to students, yet the utter impossibility of getting a sufficient number in its class rooms and laboratories will prove a grave question which it will be hardly so inconsiderate as to neglect. The endowment of these provincial schools, it is only reasonable to hope, will follow in due time, and as a matter of course, though this may not take place immediately. This very fact does away with a host of objections to a compulsory curriculum, and besides, as we have already a compulsory examination, and admitting the present desirability of schools of pharmacy, compulsory attendance at a given number of lectures will not, it may be anticipated, prove such a very great hardship when once in active operation.

In outlying districts no doubt a little pressure will be felt, but as the "Act" will not come into operation for some time, arrangements will no doubt be made accordingly, and what seems an unreasonable demand may eventually prove a blessing in disguise.

There is, however, another view of the question, and I almost regret that I have to refer to it, but the fact remains that human nature is but selfish and unaccommodating, after all, and as a consequence of apathy and inconsiderate neglect, in spite of noble individual effort both in money and in time spent, in numerous instances provincial schools have not as yet continued very successful; that is, their usefulness has been crippled by reason of the number of pupils gradually dwindling down until only one or two were left, too small a number to warrant a continuance of the school with its required staff of masters and teachers.

This I take it will give way to a new order of things. The pharmacist who takes an apprentice or pupil will be bound to give him reasonable time and opportunity for attending lectures and classes, and instead of his being a kind of superior errand boy he will be enabled in due time not only to increase in knowledge soundly acquired, but, by his increased intelligence, be of greater service to his principal, who must be dull indeed if he cannot discriminate between mere rule-of-thumb labour and intelligent and thoughtful occupation. This want of thought is the greatest stumbling block I know of which the student at present has to overcome.

That this increased mental progress will incapacitate a youth for the more ordinary duties of his calling is open to great question, and in the every day employments of life we are bound to acknowledge that they are best done by those who are best taught, bearing in mind the maxim that "whatever is worth doing at all is worth doing well."

There seems but little doubt but that the passing of a compulsory Education Act will produce a great change in some other ways, not perhaps immediately; but surely, old customs and usages will gradually pass away, new habits will be formed, and it is quite possible that in process of time the very style and manner of doing business may undergo considerable alteration.

And now having very briefly and I fear very inadequately, glanced at some of the points which occur in considering the question of Sheffield pharmacy in relation to compulsory education, it becomes a matter for us to decide whether or not we can give our support to such a measure.

On the one hand, we have, as we have seen, the old order of things, a sort of happy-go-lucky state or condition, with in some cases a fair education, in the majority little or no real knowledge, in all a very deficient, if not entire absence of a systematic course of training before accepting a position having as its consequences some of the most serious responsibilities to the State and to individuals it is possible to incur,

accompanied by a sort of public estrangement, as it were, from our ancient and time-honoured customs and methods, and a perceptible falling away by natural processes of the old and familiar landmarks of our trade and calling, a curtailing of the busy scenes of our more youthful experiences, and last, but not least, a shrinking of our pecuniary returns too apparent to be mistaken. On the other hand, a slow, certainly, but gradually increasing requirement by that great factor, the public, of a more and more enlightened intelligence, a more characteristic and improved course of procedure with its attendant interests, and, in fine, a more healthy, elastic, and manly occupation, alike honourable and deserving.

If we decide that for the pharmacist of the future such a position is desirable, then we can hardly do better than give our support to the Pharmaceutical Society's Improvement Bill now laid on the table of our legislative assembly; and if, as we shall then hope it may, it becomes law, we can reasonably look forward to the time when the chemist of the future shall take, as it is meet and right he should, a stand among his fellows which shall be a credit to him to have attained, a position of respect to his neighbour, a calling of profit to his family, and a source of intelligent interest and pleasure to himself.

Of one thing, however, we may be pretty well assured, and that is that, numerically, pharmacists will, in all probability, be considerably lessened, but not necessarily to an injurious extent, for you will readily understand a process of consolidation will thereby take place, and the Society, as an active living body, will be undoubtedly invigorated and strengthened.

Then what has hitherto been a business will gradually emerge into a profession, and the pharmacist of the future will gather the ripe fruits of the long years of toil and anxiety which have been so freely expended by those who have borne the heat and burden of the day in labouring to further the cause and raise the position and educate the apprentice of the chemist and druggist, and so we may hopefully and, I trust, justly take it that the members of a profession which requires learning, skill, constant attention, and incurs grave responsibility, shall at last occupy a position which commands that consideration and esteem, with its accompanying emoluments, its industrious and persevering followers so richly deserve.

In conclusion, may we not feel inclined to say, whilst recognizing the importance of each individually making the best of the time which is given us, and knowing also that even that is limited—

> "O, gentlemen, the time is short; to spend that
> shortness basely, were too long,
> If life did ride upon a dial's point, ending at the
> arrival of an hour."

For after all not so much does it depend upon what opportunities we have as upon what use we make of them.

If chemists and pharmacists, setting aside unmanly and enervating prejudices, will only unite and go hand in hand, and thus march along with cheerful unanimity, culling as they go the fruits of knowledge so plentifully bestrewing the path, feeling that in placing faith in the Pharmaceutical Society their confidence will not be abused, and if in the immediate future it can only be seen that due provision is made for a fair representation on the Council of all sections of the pharmaceutical community, a state of things which up to this time we cannot but feel to regret has not been altogether adequately provided for, then I think there is every reason to believe that in the not far-distant future the prospect may be brighter, more prosperous, more encouraging, and indeed in every way more hopeful, for—

> "True hope is swift and flies with swallow's wings,
> Kings it makes gods, and meaner creatures kings."

The reading of the paper was followed by a discussion, at the close of which a vote of thanks to the author was passed.

LIVERPOOL PHARMACEUTICAL STUDENTS' SOCIETY.

An ordinary meeting of the above was held on March 26 in the drawing-room of the Young Men's Christian Association, when a paper was read on—

Starches and the Iodine Test.

BY H. BELCHER THORNTON, F.C.S.

At the commencement of his paper, which was illustrated by a number of interesting experiments, the author commented upon the various processes employed for the preparation of starches, demonstrating the methods by the manufacture of potato starch. This was followed by the discussion of the starch formula, and the various tests for starch were alluded to. The writer then dwelt upon the main feature of his paper, viz., the iodide test for starch. Experiments illustrating the easy decolorization and decomposition of this body by light and heat were given, and reference was made to the fact that iodide of starch prepared with different strengths of iodine solutions gave fairly stable compounds in the presence of an excess of iodine only. The colours of bodies varied through various shades of pink and blue to dark purple-blue. The lighter shades, if moist, quickly lose their colour. The decolorization of the iodide of starch when boiled, and the return of the colour, were referred to some molecular change in the constitution of the body. Attention was directed to the decolorizing action of tannic acid upon the blue iodide, and the difficulty of detecting iodides in the presence of tannic acid by the starch test was commented upon.

Samples of inulin and lichenin were exhibited, the processes of their manufacture described, and their characteristic tests shown.

The following deductions were drawn from the experiments:—

(1) That iodine compounds with starch are stable only in the presence of an excess of iodine.

(2) That tannin has a greater affinity for starch than iodine, and that in the presence of tannate of starch an excess of iodine must be added to produce the characteristic blue coloration.

The President then called upon Mr. Tozer, who proceeded to read a "Note on the History of Jaborandi." Commencing with a notice of the various spurious jaborandis, and their characteristics and uses, he passed on to speak of *Pilocarpus pinnatifolius* and its introduction to the notice of European physicians in the year 1874. He gave an interesting account of the physiological experiments performed with it on its first appearance; afterwards taking note of the official preparations, and comparing them with those of the French and U.S. Pharmacopœias, pointing out the fact that while the British and United States authorities limit the source to *P. pinnatifolius*, the French Codex gives besides, *P. Selloanus*, Engler, and kindred species. The author also noticed the somewhat curious circumstance that in Britain the nitrate of the alkaloid is official; in the United States the hydrochlorate; and in France, the alkaloid itself, pilocarpine.

Discussions followed in which the following gentlemen took part:—The President, Messrs. W. Brinson, Wyatt, Robinson and Riddle.

The next meeting will be held on April 25, in the Society's rooms, 6, Colquitt Street, when a paper will be read by Mr. W. H. Jackson on "Landscape Photography."

Proceedings of Societies in London.

CHEMICAL SOCIETY.

A meeting of the Chemical Society was held on April 4, Dr. W. J. Russell, F.R.S., President, in the chair.

The following papers were read:—

The Rate of Dissolution of Metals in Acids. By V. H. Veley.—When the rate of evolution of a gas is taken as the measure of the amount of interaction between metals and acids, the result is due to a variety of causes, each one of which is variable at any moment of time, and its peculiar effect not susceptible of mathematical analysis. Among the varying conditions are the surface of the metal exposed, the local rise of temperature, the rate of diffusion of the metallic salt formed in the acid liquid and the rate of its removal by the gas-bubbles. In the present research metallic spheres by various mechanical devices were rolled about continuously and regularly within the acid liquid, and the products of the changes continuously removed from the immediate neighbourhood of the metal. The dissolution of copper in a solution of potassium bichromate acidified with sulphuric acid was investigated as affording a case in which no gas is evolved as such. The dependence of this action on the conditions of (i) temperature, (ii) proportion of sulphuric acid, and (iii) proportion of potassium bichromate is illustrated by various series of experiments. (i) As regards temperature, it is shown that if this be varied between 21° and 41° in an arithmetical proportion, the amount of chemical action varies in a geometrical proportion; in this respect the change is perfectly analogous to several others quite different from it and from one another. Attention is drawn to this relation as common to a number of chemical changes, and to the causes on which it is probably dependent. (ii) On varying the amounts of sulphuric acid in an arithmetical proportion within the limits of 41·3 and 23·5 grams per litre, the amount of change also varies in an arithmetical proportion. (iii) The amount of change is at first considerably increased by increase of proportion of potassium bichromate, but the effect gradually diminishes almost to *nil*, at which point the bichromate can be considered as so much inert material; the amounts used varied from 22·1 to 66·3 grams per litre.

Note on the Interaction of Metals and Acids. By Henry E. Armstrong.—When a metal forming an element in a voltaic couple is dissolved, the rate of dissolution is in accordance with Ohm's law, $C = E/R$: and this should apply also to the case in which a metal is dissolved without any precaution being taken to arrange it as an element of a couple, as the action is conditioned by the formation of, and takes place within, "local circuits." The changes attending the dissolution of metals may, therefore, in a certain sense be said to be purely electrical in the first instance; yet within recent years it has been argued by various chemists that the phenomena are only in part electrical and in part chemical—whatever this may mean. The author discusses the various phases of such changes, and criticises the conclusions arrived at by Spring and Aubel and others.

Referring to Mr. Veley's experiments, Dr. Armstrong expressed the opinion that the results were in no way commensurate with the labour expended in obtaining them; although by introducing bichromate polarisation by hydrogen had been prevented, its use had introduced complications which made the analysis of the results impossible. In fact, the information likely to be obtained from such experiments was not of the kind required in the present state of chemical science. Thus the proof obtained that a copper sphere dissolved uniformly in a mixture of sulphuric acid and bichromate was but a proof of the efficiency of the stirring apparatus. Such would necessarily be the case, as the values of E and R remained almost unchanged throughout the experiment, owing to the relatively small proportion of the agents used up.

Mr. Veley, in the course of a reply in which he attempted to justify his position, mentioned that he had had occasion to verify Dr. Russell's observation that silver is not dissolved by nitric acid, to which reference had been made, and stated that in experiments with copper and nitric acid he had observed that the action took place at first more slowly and only attained a maximum rate when a certain small amount of nitrate was formed.

Dr. Armstrong remarked that this was a really important observation, proving that the dissolution of copper in nitric acid was dependent on the presence of a third substance—perhaps cupric nitrate. The discovery of the exact conditions which determine any particular chemical change is at the present time of great importance, and investigations establishing these were much required; it was useless, however, to study cases in which complications instead of simplifications were introduced, as even the changes which apparently were of the simplest kind were probably but the end results of more or less complex series of successive or simultaneous changes.

A Zinc Mineral from a Blast Furnace. By J. Tudor Cundall.

Obituary.

Notice has been received of the death of the followihg:

On the 29th of March, Mr. Thomas Hart, Chemist and Druggist, Painswick, Gloucester, Aged 72 years.

On the 31st of March, Mr. William Wright, Chemist and Druggist, High Street, Burton-on-Trent. Aged 78 years. Mr. Wright, who was one of the earlier members of the Pharmaceutical Society, was formerly well known in the trade, he having represented Messrs. Wyleys, of Coventry, for twenty-seven years.

On the 1st of April, Mr. William George Vaughan, Chemist and Druggist, Compton Street, London. Aged 43 years.

On the 3rd of April, Mr. John Bullus, Chemist and Druggist, High Street, West Bromwich. Aged 54 years.

On the 3rd of April, Mr. Samuel Mather Webster, Pharmaceutical Chemist, Bridge Street, Warrington. Aged 73 years. Mr. Webster had been a Member of the Pharmaceutical Society since 1852.

On the 5th of April, Mr. Daniel Dunbar Sutherland, Chemist and Druggist, High Street, Totnes. Aged 45.

On the 6th of April, Mr. Gilbert Jones Cottrill, Chemist and Druggist, Shepton Mallet. Aged 61 years. Mr. Cottrill had been a Member of the Pharmaceutical Society since 1869. He was apprenticed at Ludlow, in Shropshire, and was afterwards manager for the firm of Holman and Hann, Exeter, for many years.

On the 8th of April, Mr. John Scott, Chemist and Druggist, Farnworth, Lancashire. Aged 76 years.

On the 14th of April, Mr. William Smith, Chemist and Druggist, Friargate, Preston. Aged 71 years.

ANSWERS TO CORRESPONDENTS.

J. F. Brown.—We shall be happy to receive some practical suggestions from you as to the mode of effecting that which you think desirable.

A. P. S.—Try a coating of ordinary glue.

Apprentice.—A list of the certificates received in lieu of the Preliminary examination will be found in the Society's Calendar, or may be had upon application to the Secretary.

Indignans is recommended to send information as to any breach of the Pharmacy Act of which he has evidence to the Registrar.

Communications, Letters, etc., have been received from Messrs. Matthew, Donelean, Richards, Servus.

"THE MONTH."

Methacetin.

Favourable reports upon another new antipyretic have come to hand from Austria, where it has been used in the clinic of Professor von Jaksch at Gratz (*Zeit. oest. Apot.-Ver.*, April 1, p. 165). The compound in question is methacetin, or para-acetanisidin, an acetyl compound of anisidin, represented by the formula—

$$C_6H_4\begin{cases}OCH_3\\NH\cdot C_2H_3O.\end{cases}$$

It is described as a faintly reddish odourless crystalline powder, with a somewhat bitter saline taste. It is soluble in cold water, more soluble in hot water, and very soluble in cold and hot alcohol; and dissolves equally in acid and alkaline liquids. The melting point is at 127° C. It is said to possess considerable antiputrescent properties, a 1 per cent. solution sufficing to prevent the decomposition of milk and ammoniacal fermentation. Experiments on rabbits showed that 3 grams was a fatal dose, the action being very rapid, cramps setting in quickly in the hinder and then in the forward extremity, and the general course being similar to that of antipyrin poisoning. Administered to about thirty children suffering from tuberculosis and pneumonia, it was found that generally the temperature was reduced to normal, or even lower, by doses of 0·15 to 0·20 gram. The depression continued sometimes for several hours and then gradually rose, and when the administration was made to coincide with the physiological daily remissions the fall of temperature was more rapid and lasted longer. In many fever cases considerable sweating occurred in about thirty minutes after taking the medicine; but neither sweating nor fall of temperature was observed in non-feverish persons. The methacetin appeared to be well supported by children, but in one case collapse, lasting three hours, followed the administration of 0·20 gram to a girl exhausted by tuberculosis. It is recommended that the dose of 0·30 gram for children should not be exceeded, and repeated small doses are less advisable than a single larger one. But it is evident that the solubility and consequent rapid absorption of methacetin suggest the necessity for great caution in the experimental use of so powerful a substance.

Dithiosalicylic Acid.

Dithiosalicylic acid has been suggested as a substitute in some cases for salicylic acid and as a starting-point for a new series of compounds. It is prepared by heating together at 120° to 150° C. equal molecular proportions of salicylic acid and sulphur chloride, and the combination that takes place is represented by the equation:—

$$2C_6H_4\begin{cases}OH\\COOH\end{cases}+2SCl\ =$$

$$2HCl + \begin{matrix}S-C_6H_3-COOH\\|\\S-C_6H_3-COOH\end{matrix}$$

(each OH and COOH group on the C_6H_3 rings)

At first there is formed a pale yellow resinous fused mass, which is dissolved in soda solution, and from this dark yellow liquid the dithiosalicylic acid is then precipitated as a resinous straw-yellow mass by means of hydrochloric acid. When dried it is pale yellow, dissolves easily in spirit, benzol and glacial acetic acid and melts readily. Upon treating a concentrated solution with sodium chloride the sodium salt of dithiosalicylic acid is thrown down as a crystalline yellow precipitate, which when dried and triturated yields a pale yellow powder. It will be remembered that the use of a sulpho compound of salicylic acid was recommended several years since by the late Mr. John Williams (*Pharm. Journ.*, [3], vii., 280).

Exalgine.

Some little doubt seems to have arisen as to the identity of exalgine, recently reported on favourably as an anodyne by Messrs. Dujardin-Beaumetz and Bardet (see before, March 30, p. 781), on account of its description as *ortho*-methylacetanilid, as distinct from meta- and para- isomeric compounds. In a communication to the Academy of Sciences (*Compt. Rend.*, April 8, p. 749) M. Giraud says: "The name *ortho*-methylacetanilid can be applied but to one substance, described by Beilstein and Kuhlberg under the name 'aceto-orthotoluid,' and prepared by means of orthotoluidine and acetic acid. The substance prepared by M. Brigonnet is not new; it was described by Hofmann in 1874. Its true designation is methylacetanilid and it cannot exist under three modifications, for the phenyl radical contained in its molecule is not substituted. This substance is utilized in laboratories for the preparation of monomethylaniline and is manufactured on a large scale and at a low price."

Overdose of Sulphonal.

From Germany there comes an interesting statement as to the effects following the taking of a large overdose of sulphonal. On Saturday evening, January 5, about seven o'clock, a workman employed in Riedel's factory, wishing to secure a sound sleep, took a good tablespoonful of sulphonal. About half an hour afterwards, not feeling any effects from the dose, he swallowed two tablespoonfuls more and went to the village ale-house. In another half hour, after drinking part of a glass of beer he experienced so strong a feeling of lassitude that he left the remainder of his beer and went home to bed. He states that he remembers nothing more until the morning of Tuesday the 8th, when he was violently roused, but after recognizing the persons around him he immediately went off to sleep again. The next day at one o'clock he was again roused by his wife and remained awake, though feeling giddiness, until eight o'clock, during which time, being hungry, he ate some food with relish. The next morning, Thursday, the 10th, he rose at seven o'clock, and by the evening all the symptoms had disappeared.

Antipyrin and Quinine.

It has been pointed out (*Apot.-Zeit.*, April 10, p. 390) that antipyrin possesses the property of increasing the solubility of some salts of quinine. If 0·40 or 0·50 gram of antipyrin be added to 1 gram of quinine hydrochlorate it will dissolve in two grams of water at a temperature of 20° to 31° C., and with only 0·20 to 0·25 gram added it will dissolve at 44° to 50° C. Without any addition 1 gram of quinine hydrochlorate requires a temperature of 53° to 56° to dissolve it in the same quantity of water. Moreover, whilst upon cooling the quinine salt crystallizes out at once, the quinine-antipyrin solution can be preserved a long time unaltered. The almost insoluble valerianate of quinine behaves similarly, 1 gram with 1 to 1½ grams of antipyrin dissolving in double its weight of water at 44° to

62° C. It is suggested that this property may find a practical application in the preparation, without the addition of acid, of stable solutions of quinine for hypodermic use.

Antipyrin and Sodium Salicylate.

At a recent meeting of the Paris Pharmaceutical Society attention was called by M. Preudhomme to an incompatibility between sodium salicylate and antipyrin, which renders it undesirable that they should be prescribed together in the powder form. In commenting upon this observation (*Bull. Com.*, Mar. 31, p. 130), M. Vigier said that these compounds, when dispensed in contact with each other in the dry state, appear to undergo decomposition, whether the crystallized or the amorphous salicylate be used, with the formation of an oily liquid that renders the mass pasty, and may in twenty-four hours constitute 10 per cent. of the whole. No perceptible alteration takes place, however, in a solution of the two compounds. Although the reaction of sodium salicylate is faintly acid, the pasty product of the salt with antipyrin is alkaline, but a solution of the two compounds remains faintly acid.

Salol and Camphor.

When a mixture of salol and camphor is heated it liquefies and forms a product of the consistence of glycerine, which has been used to some extent in the place of iodoform as an antiseptic. When submitted to cold this liquid crystallizes and the crystals so formed have been ascertained by M. Léger to consist entirely of salol (*Répertoire*, April 10, p. 185), and to take the ordinary form of that compound when recrystallized from alcohol. He concludes therefore that the so-called camphorated salol is not a definite compound, but a mixture, which when exposed to the air or heated with water loses all its camphor.

Quinine Lactate.

Having found that commercial samples of quinine lactate do not correspond with the requirement of the French *Codex*, that the compound should be soluble in three parts of water, M. Vigier has suggested a method of preparing it extemporaneously when required for hypodermic injection (*Journ. Pharm. Chim.*, April 1, p. 355). It consists in dissolving 21·65 grams of quinine sulphate in 400 grams of water and 25 grams of dilute sulphuric acid, precipitating with excess of ammonia, filtering and washing the precipitate. The precipitate is then placed in a tared capsule with about 5 grams of lactic acid, and 100 grams of distilled water added at a temperature of about 80°, in order to obtain a clear solution and to effect its neutralization conveniently; after which it is evaporated down to 100 grams upon a water-bath, allowed to cool, filtered and preserved in a bottle with a paraffined stopper. Each 5 grams of this solution would represent 1 gram of quinine lactate.

Calcium Strophanthate.

A short time since it was stated (*Ph. Journ.*, Feb. 2, p. 606) that M. Catillon had separated from the seeds of *Strophanthus Kombé* a non-toxic diuretic principle that appeared to be a calcium compound of a nitrogenous acid. Although the chemical history of this interesting substance is still far from complete, some further information respecting it has appeared (*Répertoire*, April 10, p. 156). Calcium strophanthate is described as being tasteless and deliquescent and turning red litmus paper blue. A solution gives with sulphuric acid or ammonium oxalate a precipitate of the respective calcium salt, but with carbonic acid no turbidity. A solution acidulated with hydrochloric acid gives a precipitate with potassium iodhydrargyrate or sodium phosphomolybdate, and it is considered probable the report that strophanthus seeds contain an alkaloid has originated in this reaction. The acid, which is thought to be an amide, has been isolated by treating the solution of the calcium compound with sulphuric acid until precipitate ceased to form, filtering, and precipitating with great excess of alcohol.

Constitution of Cinchona Alkaloids.

The study of the chemical constitution of the more complex vegetable alkaloids promises to furnish work for the chemist for a long time to come. The subject is so difficult and the communications published respecting them are usually so abstruse and technical that it is puzzling to glean from them anything suitable for these columns. But now and again it occurs that the completion of a series of investigations allows a glimpse at definite progress made, and this happens to be the case just now with the work on the cinchona alkaloids. In attempting the solution of the problem as to the constitution of these alkaloids by analytical methods Professor Skraup ascertained some time ago that when quinine and quinidine, cinchonine and cinchonidine, were subjected to limited oxidation by means of potassium permanganate formic acid was split off, leaving new bases of the corresponding composition. Subsequently, he found that upon the more complete oxidation of cinchonine, or of its limited oxidation product cinchotenin, by means of chromic acid, a part was converted into a new acid that he called cinchoninic acid ($C_{10}H_7NO_2$) and looked upon as a chinoline derivative. Last year (*Monatshefte*, August, p. 783) he reported that in the syrupy mother-liquor left after the removal of cinchoninic acid, and which he calls the "second half" of cinchonine, he had found a new base, cincholoipone ($C_9H_{17}NO_2$), and a new acid, cincholoiponic acid ($C_8H_{13}NO_4$), possibly a product of the oxidation of cincholoipone. These products of the "second half" of cinchonine, it is interesting to note, are looked upon as piperidine derivatives, so that in this alkaloid a piperidine ring is probably combined with a chinoline residue. The characteristic oxidation products of cinchonine may therefore be described as cinchoninic acid, cincholoipone and cincholoiponic acid. Still more recently (*Monatshefte*, Jan., p. 39) Professor Skraup reports that, in like manner, when quinine, or its limited oxidation product chitenine, is oxidized by means of chromic acid, it splits into two portions, one consisting of quininic acid ($C_{11}H_9NO_3$) and the other containing cincholoiponic acid and cincholoipone. It therefore seems probable that the "second half" of quinine is identically constituted with that of cinchonine. In still another communication (*Monatshefte*, Jan., p. 51) Herr Schniderschnitch reports that under the influence of chromic acid cinchonidine splits up into cinchoninic acid, identical with that derived from cinchonine, and cincholoiponic acid; whilst in a fourth paper (*Monatshefte*, Jan., p. 65) Dr. Würstl reports that quinidine splits up into quininic acid and cincholoiponic acid. Cincholoipone was not detected in the oxidation products of either cinchonidine or quinidine. But what is worthy of note is that the cincholoiponic

acid from the "second half" of the lævogyre alkaloids, as well as that from the dextrogyre alkaloids was always dextrogyre, which seems to indicate that the difference between the optically opposed cinchonine and cinchonidine, both containing cinchoninic acid in the "first half," and between quinine and quinidine, both containing quininic acid in the "first half," may depend entirely upon the physical arrangement of the molecule.

Coca Bases.

Dr. Hesse has continued the investigation of the amorphous bases associated with cocaine, and has come to the conclusion that those present in true coca leaves are chemically distinct from the amorphous bases in Truxillo leaves. He has now altered the formula of the base which he obtained from Truxillo leaves and to which he gave the name of cocamine (*Pharm. Journ.*, 18, p. 72) from $C_{17}H_{21}NO_4$ to $C_{19}H_{23}NO_4$. This latter is the formula assigned by Liebermann to isatropylcocaine, and the reason given for the alteration is that the base analysed had been found to contain water, which cannot be separated by drying. Dr. Hesse is of opinion that Liebermann's isatropylcocaine is essentially nothing more than cocamine, and that the acid $C_9H_8O_2$ finally formed by heating it with hydrochloric acid, which Liebermann has described as γ-isatropic acid, should be termed cocaic acid. The paper by Dr. Hesse on coca bases, which will be found on p. 866, has called forth a reply from Professor Liebermann, in which he defends himself against the charge of having interfered with Dr. Hesse's investigation by stating that his experiments were almost completed before he became aware that Dr. Hesse was working on this subject. He adds, moreover, that he would then have left his paper unpublished if it had not been that, on comparing his results with those described by Hesse, there was reason to believe the alkaloids cocamine and cocaidine were quite different from those he had examined. Thus while Hesse assigned to both cocaidine and cocamine the formula $C_{17}H_{21}NO_4$, and regarded them both as isomers of cocaine, Liebermann gave isatropylcocaine the formula $C_{19}H_{23}NO_4$, not only on the basis of analysis, but also because of its decomposition into ecgonine, methyl alcohol and two forms of isatropic acid. Hesse, on the contrary, described the acid produced in the decomposition of cocamine as crystallizing like benzoic acid, though apparently differing from it; and the basic product as being different from ecgonine. In regard to the present interpretation of the experiments from which the composition of cocamine was deduced, however, Liebermann disputes Hesse's right to make the alteration he has done without recognizing Liebermann's work, and he maintains that the alteration of the formula of cocamine from $C_{17}H_{21}NO_4$ to $C_{19}H_{23}NO_4$ by means of the assumption that the substance analysed by Hesse contained half a molecule of water is quite arbitrary and inadmissible. In regard to the application of the name cocaic acid, instead of isatropic acid, to the acid produced together with ecgonine by decomposition of the base in question, and the objection raised by Hesse to Liebermann's determination of its melting point, the latter maintains that his datum of 274° C. is the correct melting point of the pure substance, and that he is therefore justified in rejecting the name cocaic acid. On the ground that the above-mentioned acid and its isomers are more intimately related to cinnamic acid, than to atropic acid, Professor Liebermann now proposes to alter their nomenclature, so as to indicate their occurrence in a particular kind of coca leaves. The several forms of the acid would therefore be—

γ isatropic acid	= α truxillic acid	
δ „	„ = β truxillic acid	
ϵ „	„ = γ truxillic acid	
γ isatropylcocaine	= α truxillococaine	or α truxilline
δ „	= β „	„ β „

The amorphous basic substance for which Hesse suggested the name cocaidine is now admitted by him to be a mixture, and Liebermann thinks that the names cocrylecgonine, cocrylic acid, etc., may only represent similar mixtures. In regard to the suggestion that the poisonous character of isatropylcocaine was due to the presence of an impurity, Liebermann positively affirms that this was not the case, and he adds that Professor Liebreich will shortly furnish further particulars as to its poisonous character. In the same paper Professor Liebermann deals with the statement lately made by Einhorn to the effect that the splitting up of the amorphous coca bases into acids and ecgonine had been known and practically applied long before the fact was published by Liebermann and Giesel, and he points out that instead of the paper he mentions Einhorn should have referred to one published three months previously, in which the spliting up of the alkaloids associated with cocaine was fully described. He also expresses a doubt as to that observation having been then known or applied. That such was not the case seems to be indicated by the circumstance that Hesse, notwithstanding his intimate connection with the manufacture of cocaine, was not, as already shown, aware of it. Neither was it known in the Brunswick quinine factory before Liebermann pointed it out, although large quantities of cocaine had been there manufactured from coca leaves. The small quantities of ecgonine which had long been met with as a bye-product in the manufacture of cocaine, were regarded as originating from an accidental decomposition of cocaine itself. But however this may be with regard to the firm which claims a prior knowledge of the splitting up of the associated alkaloids, Professor Liebermann insists that it is quite unjustifiable for those who, for commercial reasons, kept their observations secret to come forward subsequently as claimants of priority against those who have by publication made the results of independent scientific investigation generally useful.

Hygrine.

In another paper on the subject of hygrine, Liebermann states that his observations differed so much from those of Hesse as to induce him to continue the inquiry. A further reason was that he had received as much as a pound of the raw material obtained almost in the same manner that Lossen described. But instead of regarding hygrine as $C_{12}H_{13}N$, or trimethyl-chino line, as Hesse does, he found the material on which he operated to consist of a mixture of oxygenated bases. It was a dark coloured oily liquid with strong alkaline reaction and almost insoluble in water. When distilled under normal pressure it was partly decomposed, but could be partly volatilized by water vapour, though Liebermann was unable in that way to obtain an individual product. By distillation in partial vacuum the mixed nature of the substance was indicated by the different boiling points of the first and last portions of the

distillate. Neither of these had the composition of Hesse's hygrine, but contained oxygen in both instances. The base having the lowest boiling point 193°–195° C. had a specific gravity of 0·940 at 19° C. Its analysis led to the formula $C_8H_{15}NO$. The vapour density 141 to 131. The picrate was the only salt of this base that was suitable for analysis. It had the form of yellow needles crystallizable from alcohol, and tolerably soluble in water. Though the composition of this base is the same as that of tropine it is quite different from that base. Its possible relation to ecgonine may be indicated by the fact that the formulæ of these two bases differ by CO_2. The less volatile portion of the basic material could not be distilled under normal pressure : its specific gravity was 0·982 at 18° C., and its composition is probably represented by the formula $C_{14}H_{24}N_2O$. The hydrochloride obtained by adding alcoholic hydrochloric acid to an ether solution of the base was a flocculent precipitate. Neither of these bases showed any signs of being split up into acids and methyl groups.

Synthesis of δ- and γ-isatropylcocaine.

In a previous memoir (*Pharm. Journ.*, Feb. 2, p. 605) Professor Liebermann mentioned that he had been unable to effect the synthesis of γ-isotropylcocaine, since the γ-isatropic anhydride was converted into the isomeric ϵ-anhydride. But as the δ-isatropic anhydride was the true anhydride of the δ-acid, it was probable that δ-isatropylcocaine might be obtained from it, and this has now been done. Professor Liebermann and W. Drory have also succeeded in preparing the true chloride and anhydride of γ-isatropic acid, as well as the corresponding γ-isatropyl cocaine, so that both these natural associates of cocaine have been produced synthetically. δ-isatropyl ecgonine $C_{18}H_{21}NO_4$ is insoluble in ether, water, benzol and petroleum spirit ; it dissolves readily in ammonia and in acids. By crystallizing from alcohol it is obtained in colourless needles which melt at 202° with decomposition. δ-isatropyl cocaine, $C_9H_{13}(C_9H_7O)(CH_3NO_3$, prepared synthetically agrees in all respects with the natural base. It has a bitter taste and produces numbness of the tongue very slowly by reason of its sparing solubility. γ-isatropylcocaine $C_{19}H_{23}NO_4$ was obtained by first converting ecgonine into γ-isatropylecgonine by heating with γ-isatropic anhydride and then methylating the product. The base is in all respects identical with that naturally associated with cocaine. It is very bitter, and when heated with mineral acids it yields the pure γ-isatropic acid, with a melting point of 274° C.

Strychnine and Homostrychnine.

In an investigation of the platinous compounds of some of the alkaloids Dr. Koefoed has made an observation that leads him to believe that commercial strychnine contains at least two alkaloids (*Chem. Zeit., Rep.*, March 16, p. 78). He reports that upon precipitating a hydrochloric acid solution of the alkaloid with potassium platinoso-chloride there is at first separated a compound in which the platinum amounts to 18·8 per cent., and subsequently another in which the quantity found was 19·35 per cent. The first quantity corresponds to a molecular weight of 347·59 and the second to 333·18, and the difference, 14, corresponds to CH_2. The ordinary formula for strychnine, as given in the Pharmacopœia, is $C_{21}H_{22}N_2O_2$, which would be equal to a molecular weight of 333·31. Dr. Koefoed considers therefore that he is justified in assuming that in commercial strychnine the $C_{21}H_{22}N_2O_2$ compound is accompanied by another that is represented by the formula $C_{22}H_{24}N_2O_2$, to which he gives the name "homostrychnine." For a similar reason he has arrived at the conclusion that ordinary "brucine" consists of two alkaloids, the molecular weights of which are approximately 398·24 and 414·85.

Antiarin.

The juice of the upas tree, *Antiaris toxicaria*, concerning which such extraordinary stories were formerly told, has been examined by Professor Bettink, of Utrecht, who reports that he has separated from it three physiologically active substances, which he designates "antiarin," "oepain," and "toxicarin" (*Nederl. Tijdsch. voor Pharm.*, April, p. 107). Antiarin is described as crystallizable, and having the composition represented by the formula $C_{14}H_{20}O_5$, which is the same as that attributed by Mulder to the substance he called "antiarin;" but Professor Bettink's compound is described as being soluble with difficulty in water and not precipitated by tannin. Oepain is non-crystallizable and is easily soluble in water and in spirit; it is precipitated by tannin, the precipitate being soluble in spirit. Toxicarin is non-crystalline, hygroscopic and easily soluble in water and in spirit, from which it is not precipitated by tannin. Neither of the amorphous substances has been yet obtained in a condition that would allow of a satisfactory analysis being made.

Salicylic Acid.

In order to detect the presence of meta- or paraoxybenzoic acid in salicylic acid (orthooxybenzoic acid) Professor L. de Koninck recommends a method based upon the fact that salicylic acid volatilizes in the vapour of water (*Pharm. Zeit.*, April 6, p. 222). A small quantity of the acid to be examined is reduced to a finely-divided condition with water, and is then evaporated slowly to dryness in a porcelain dish. The acid should entirely volatilize ; if there be any residue it would indicate the presence of one or other of the isomers, or more probably a mixture of both.

Gymnemic Acid.

About two years since Mr. D. Hooper published in this Journal (vol. xvii., p. 867) some results of a chemical examination of the leaves of *Gymnema sylvestre*, which were said to possess the curious property of rendering the palate temporarily insensible to the taste of sweet and bitter substances. Of the constituents separated the one to which this property was considered referable was an acid resin, to which he gave the name "gymnemic acid." In a recent paper (*Chem. News*, April 5, p. 159) Mr. Hooper more nearly describes this compound as a brittle black resinous substance, of a greenish colour when reduced to powder, insoluble in water, soluble in alcohol, ether and chloroform, and slightly so in amylic alcohol and carbon disulphide. It exists in the leaves as a potassium salt, and is best prepared by treating an aqueous solution of the alcoholic extract of the leaves with a mineral acid, washing the precipitate and drying it in a current of hot air. With potash, soda and ammonia the resin forms fine red solutions showing an orange-coloured froth and it is reprecipitated by acids. It is also precipitated by ferric chloride, silver nitrate, barium and calcium salts, but not by tannin,

picric acid or gelatine solution. With alkaloids it forms insoluble compounds, to which property is attributed its power of masking the taste of quinine and other bitter substances. Analysis gave results indicating that it is a monatomic acid, having a composition represented by the formula $C_{32}H_{55}O_{12}$. Gymnemic acid has also been found in considerable quantity in *Gymnema hirsutum* and in smaller proportion in the leaves of *G. montanum*.

Hysteronica Baylahuen.

The *Hysteronica Baylahuen*, a small Chilian composite plant, said to present considerable analogy to *Grindelia robusta*, has been the subject of a communication by Dr. Baillé (*Répertoire*, April 10, p. 165). The most striking characteristic of the plant is a yellow odorous resinous exudation that covers all its parts and gives it, when dried, the appearance of a plant that has been dipped in resin. The plant contains a brown acrid resin and an essential oil, but no alkaloid. In Chili it is employed in certain gastro-intestinal affections, and Dr. Baillé says that he has found an infusion (1 in 150 of water) an excellent remedy against diarrhœa. It has been also reported to be useful in acute and chronic dysentery.

Copaiba Balsam.

In a report upon the examination of a number of resins, gum resins and balsams (*Pharm. Centralh.*, April 18, p. 253), Herr E. Dieterich states that Canada balsam, Maracaibo copaiba balsam, styrax and Venetian turpentine all give the same acid number. The three kinds of copaiba balsam however differ from each other considerably in this respect, the acid numbers found being Maracaibo 73·7, East Indian 6·5 to 7·4, and Para 52·3 to 53·2, so that an admixture of one with the other could be easily recognized. It is also noteworthy that the East Indian balsam, unlike the Maracaibo or Para, contains 10·3 to 11·2 per cent. of ester.

Arsenical Glycerine.

The statement made some time since that in Germany glycerine is met with containing arsenic has been confirmed, and in addition it has been alleged that under the present conditions of manufacture in that country all glycerine will contain more or less arsenic derived from the sulphuric acid used in its production. The necessity for the insertion in the German Pharmacopœia of a test for arsenic in glycerine is therefore obvious, and one has been suggested by Dr. Vulpius (*Apot.-Zeit.*, April 10, p. 390). It requires that paper moistened with 50 per cent. solution of silver nitrate, when exposed to the hydrogen gas evolved upon adding zinc to a mixture of 2 c.c. of glycerine with 3 c.c. of official hydrochloric acid, should not within fifteen minutes show any yellow spots becoming black upon being moistened with water.

Sulphur in Ether.

Referring to the test recently described by Professor de Koninck for the presence of sulphur in ether (see before, Feb. 2, p. 607), consisting in shaking the ether with metallic mercury, Dr. Ten Bosch points out (*Nederl. Tijdschr. voor Pharm.*, April, p. 113) that the blackening of the metal is not conclusive evidence of the presence of sulphur, since the same effect is produced by hydrogen peroxide, which is quite as probable a contamination, the black precipitate then formed consisting of a mixture of metallic mercury and mercurous oxide. In the event of blackening taking place, the presence or absence of hydrogen peroxide should be determined by ascertaining whether an aqueous solution of chromic acid is turned blue or a solution of potassium iodide yellow. To detect sulphur he recommends that the black powder should be fused with soda and saltpetre, the fuse treated with nitric acid and then tested for sulphuric acid with barium chloride.

Chloroform Danger.

A communication from Dr. Stobwasser, reporting the occurrence of untoward symptoms during the administration of chloroform in a room where a gas flame was burning, apparently as a consequence of the formation of some noxious compound, has called forth several other notices to a similar effect (*Pharm. Zeit.*, April 6, p. 221). Professor Iterson, of Leyden, says that during last winter severe and sudden asphyxia occurred repeatedly in the operation room of a small newly-erected hospital where on account of insufficient heating arrangements the gas lamps were ignited on cold days. In one case even death resulted under conditions that he thinks inexplicable except by referring it to the combination of chloroform vapour with the combustion gases of the gaslights. As soon as a larger stove was obtained and the burning of gas discontinued during operations the chloroform narcosis became again normal. Dr. Fischer, of Carlsruhe, reports a case where after a time all present in the room were affected by an irrepressible tendency to cough, followed by sense of fullness in the head, headache, and even vomiting. The room appeared full of a whitish vapour, especially in the neighbourhood of the gaslamp. Dr. Hartmann, of Ottenstein, also records a case where an odour of chlorine was noticed and a tendency to cough was developed in all present, which was relieved upon the access of fresh air. The observation is not a new one, since in a passage quoted from v. Langenbeck there is a warning that operations by gaslight might become dangerous through the formation from the volatilized chloroform of the irrespirable chlorocarbonic acid.

Ointment Bases.

Some recently reported experiments as to the relative fitness of certain substances as bases for ointments, whilst confirming earlier statements, have yielded some fresh information (*Pharm. Zeit.*, March 27, p. 198). In a series of experiments with lard, lanolin, glycerine ointment and paraffin ointment, Dr. Böhn added strychnine nitrate to ascertain the general action and cantharidin and veratrine for determining the local action. Lard proved to promote the most easy absorption of the added substances, its disadvantage being that it easily turns rancid and then acts as an irritant. Paraffin ointment, which is unalterable, is best suited for the preparation of ointments that do not contain much water, and when absorption of the added ingredients is not desired. Glycerine ointment, also unalterable, but causing irritation to broken surfaces, is best suited for the preparation of ointments containing added water; it promotes the absorption of the active ingredients. Lanolin, also unalterable, favours the local action of incorporated medical substances, but retards absorption. In another direction Herr Gottstein has experimented whether the suppression of antiseptic action that has been observed to take place in mixtures of carbolic and salicylic acids, thymol and similar sub-

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stances with fats occurs also in mixtures of the same with lanolin. He reports that carbolic acid, thymol and menthol, when mixed with lanolin, exercise no disinfecting action, but that mercuric chloride mixed with lanolin is as powerful a disinfectant as when in aqueous solution. For this reason he suggests the use of a mixture of mercuric chloride and lanolin of suitable strength in the treatment of wounds in the place of irrigations with sublimate solution.

Electricity and Germination.

In order to study the influence of voltaic electricity, Mr. H. N. Warren placed pads of cotton, saturated with a dilute solution of salt and sown over the surface with common mustard seed, upon the platinum plates connected with four constant ferric chloride cells (*Chem. News*, April 12, p. 170). In less than twenty-four hours germination over the positive plate was distinctly visible, and at the end of a week the growth was upwards of an inch in height and of an intense green colour. In the same time on the negative plate germination had only commenced and the growth was almost white. On reversing the current the previously flourishing growth became bleached and speedily withered, whilst the other gradually assumed a green colour, flourished for a time, and then also withered. The bleaching of the growth in the neighbourhood of the temporarily negative plate is thought to have been due to the small but constant liberation of chlorine, and it seems evident that this factor must be excluded from the experiment before correct conclusions can be drawn as to the relative influence of the positive and the negative current on germination.

CHEMISTRY OF THE COCA BASES.*

BY DR. O. HESSE.

The somewhat vague discussion that appeared about two years ago in pharmaceutical journals in regard to "amorphous cocaine" induced me to publish my observations on that subject in the *Pharmaceutische Zeitung*,† while expressly reserving to myself the further investigation of the bases cocamine and hygrine then described very briefly. Liebermann has,‡ however, without waiting for the completion of that inquiry, lately published his investigation of isatropylcocaine, which is for the most part nothing else than the cocamine discovered by me in 1886. Though the investigation of cocamine was at that time all but complete so far as relates to cocamine, I have thought it desirable to continue the inquiry, more especially since the crude bases I operated upon had not been subjected to the action of permanganate, as was the case with the material on which Liebermann operated. However, the subject of my investigation has also been touched by Frankfeld, § and therefore in order to avoid further collision it appears desirable to make known at once the results I have arrived at so far.

In the first place I must mention that two sorts of coca leaves are now met with in commerce. The one sort is derived from *Erythroxylon Coca*; it was formerly investigated by Erdmann and Lossen, and was for some time the only material employed in the preparation of cocaine. Subsequently a second sort came into the market, originating from a variety of *Erythroxylon* growing in Jamaica and St. Lucia, which has been regarded, though perhaps incorrectly, as a variety of the well-known coca plant and termed *Novagranatense*. It is chiefly this latter kind of coca that has hitherto been used in North Germany for making cocaine.

Cocamine was obtained by me from the last mentioned variety of coca leaves, and from a parcel that contained chiefly that base to the extent of nearly 0·6 per cent. In operating upon the crude base with petroleum spirit some part of the cocamine remained undissolved and by repeatedly dissolving that in dilute acetic acid and precipitating with ammonia the base could soon be rendered sufficiently pure for analysis. In the following statement of the results thus obtained the figures marked A relate to the base precipitated from a dilute solution and perfectly crystalline. Those marked B relate to the hydrochloride dried at the ordinary temperature over sulphuric acid.

	A.		B.
	Dried at the normal temperature.	Dried at 53° C.	
C. . . .	67·46	67·43	59·71
H . . .	6·99	7·09	6·81
N . . .	4·33	—	—

These results agree well with the formulæ $C_{17}H_{21}NO_4$ and $C_{17}H_{21}NO_4HCl$, by which I considered the composition of cocamine was represented, especially since platinum determinations gave corresponding results. However, a subsequent determination of chlorine in the hydrochloride gave only 9·11 per cent. This discordant result induced me to examine more closely the products of decomposition, and in that way I ascertained that the true formula of cocamine is $C_{19}H_{23}NO_4$. Hence the substances represented by A and B were really $C_{19}H_{23}NO_4+\frac{1}{2}H_2O$ and $C_{19}H_{23}NO_4HCl+H_2O$.

The attempt to determine the water in the pure base was unsuccessful. When heated to 90°-95° C. it melted, but there was no loss of weight. On heating to 120° C. the loss of weight was very near that corresponding to $\frac{1}{2}H_2O$, but the examination of the residue showed that some methyl alcohol must have been given off as well as water. By long continued heating at this temperature a point is reached at which the decomposition of the base goes on rapidly and a refreshing odour is given off. This is probably due to the formation of the methyl ester of cocaic acid.

The hydrochloride undergoes decomposition even more readily than the base itself. Even at 100° C. it gives off, together with one molecule of water, a certain amount of methyl chloride; if the salt be heated for some hours to 120° C. the residue contains only traces of chlorine. This decomposition takes place according to the following equation:—

$$C_{19}H_{23}NO_4HCl+H_2O=C_{18}H_{21}NO_4+CH_3Cl+H_2O.$$

The residue thus left is chiefly cocamylecgonine $C_{18}H_{21}NO_4$, but owing to a secondary change it contains some cocaic acid.

A similar decomposition takes place when the water solution of the hydrochloride is boiled for some time, but then the methyl is given off chiefly in the state of methyl alcohol, and on cooling the cocamylecgonine separates as a colourless or yellowish oil. When the solution of the salt is mixed with hydrochloric acid, the decomposition is not only promoted but the cocamylecgonine produced is also split up into ecgonine and cocaic acid.

$$C_{18}H_{21}NO_4+H_2O=C_9H_{15}NO_3+C_9H_8O_2.$$

I have given the name of cocaic acid to the product thus formed, because it is characteristic of coca. To purify this acid the crude product is boiled with lime and water. From a dilute solution of the lime salt hydrochloric acid precipitates the acid in a crystalline form; by recrystallization from boiling glacial acetic acid it is obtained in the form of small colourless laminæ which melt at 266° C. Cocaic acid is

* Translated from the *Berichte*, xxii., 665.
† *Pharmaceutical Journal*, xviii., 71, 437.
‡ See "The Month," Sept. 29, 1888, and Feb. 2, 1889.
§ *Berichte*, xxii., 133.

sparingly soluble in ether, but it dissolves more readily in hot alcohol, and on cooling crystallizes out in needles. The composition of cocaic acid is represented by the formula $C_9H_8O_2$. The lead salt $(C_9H_8O_2)_2Pb + H_2O$ crystallizes in small needles.

Cocaic acid is in fact nothing else than the substance that has been meanwhile described by Liebermann as γ-isatropic acid, but the melting point assigned to it by that chemist is incorrect and too high.

In the residue left after treating the crude cocaic acid with lime there was a lime salt of another acid that dissolved readily in ether, and crystallized from the ether solution in long flat prisms. The quantity obtained was too small for analysis.

After removing this acid, the hydrochloric solution left on evaporation a residue of ecgonine hydrochloride. It melted at 234°–238° C. with considerable frothing. Liebermann gives the melting point of ecgonine hydrochloride as 246° C., but the whole of the alkaloid would have been decomposed long before reaching that temperature. This decomposition begins in fact far below 234° C., about 200° C., and its commencement is recognizable by the crackling of the crystals. The platinum salt, which is obtainable in several forms as laminæ, prisms and granular crystals, contained 25·26 per cent. platinum, and the formula $(C_9H_{15}NO_3)_2PtCl_6H_2$ requires 24·93 per cent.

Professor Stockman informs me that the physiological action of cocamine is similar to that of cocaine, but somewhat weaker, so that it must be given in larger doses; its anæsthetic action is especially weak. Experiments that I made upon myself confirm Stockman's observations, and I wish to point out that I was unable to detect any poisonous effect of cocamine. This is the more remarkable, since Liebermann states that the so-called γ-isatropyl-cocaine does not act like cocaine but as a heart poison. An explanation of this discrepancy will perhaps be found further on.

Attempts were made to obtain cocamine from the crude bases that remained dissolved by petroleum spirit after the cocaine had been separated from that solution, but without success. It was only after the mass dissolved by dilute sulphuric acid had been treated with permanganate until no further reduction took place that a product was obtained by fractional precipitation, which when boiled with dilute hydrochloric acid gave for the most part ecgonine and cocaic acid, together with methyl chloride. At the same time there was obtained a minute quantity of a brownish-yellow oil, which resisted the action of the boiling acid. The same result was obtained in operating upon a specimen of isatropyl-cocaine sent to me by Professor Stockman.

When the crude bases obtained by fractional precipitation were dissolved in ether, and the solution evaporated, there remained a syrupy mass, which when heated for some time to 60° C., no longer dissolved completely in dilute acids. But the portion insoluble in dilute acid was dissolved by ammonia. The solution gave white flocculent precipitates with barium chloride and dilute acids. The substance could be obtained pure by repeated solution in ammonia and fractional precipitation with hydrochloric acid. When dried in the air it could be rubbed to a yellowish-white powder that melted near 120° C., and was readily soluble in ether, ammonia and caustic soda, but not in dilute acids. When heated with concentrated hydrochloric acid this substance did not give off methyl, but when boiled with dilute acid it melted to a yellowish oil, and after some long time was completely decomposed, yielding ecgonine and an acid that was not more closely examined. The composition of this substance is represented by the formula $C_{18}H_{19}NO_4$.

It is probable, therefore, that the acid product contained two atoms less hydrogen than cocaic acid, and that its relation to that acid is the same as that of acrylic acid to propionic acid. For that reason I give the acid the name of cocrylic acid, the substance it is derived from that of cocrylecgonine, and the methylated cocrylecgonine, which would correspond with cocamine, that of cocrylamine. The brownish-yellow oil observed in the decomposition of the so-called isatropylcocaine by hydrochloric acid may be for the most part only cocrylecgonine, and its production may be due to the presence of some cocrylamine in the isatropylcocaine. That moreover is probably the reason that the product obtained by Liebermann from the crude bases possessed poisonous characters.

The liquid from which cocamine had been separated by fractional precipitation by ammonia still contained substances that could be extracted by petroleum spirit and obtained as a tolerably liquid oil that was readily soluble in dilute hydrochloric acid. Platinic chloride added to the solution gave a pale yellow precipitate which contained 19·44 per cent. platinum after drying at 110° C. The last fraction gave only 18·22 per cent. platinum, and therefore the substance was a mixture.

This mixed substance, when boiled with dilute hydrochloric acid, yielded some ecgonine as hydrochloride and an oily non-volatile base, together with some hygrine. The latter was separated by adding baryta and shaking out with ether. There were also obtained cocaic acid, apparently corresponding in quantity to the ecgonine, much cinnamic acid* and some benzoic acid. The cinnamic acid was separated in the form of a lime salt, crystallizing in small needles very sparingly soluble in cold water and consisting of $(C_9H_7O_2)_2Ca + 3H_2O$.

The melting point of the acid was 131° C., or rather less than that observed by Kraut, Liebermann and Frankfeld. With permanganate it yielded benzoic aldehyd. In regard to the acid said to be benzoic it may be mentioned that its melting point was 121° C., and that it gave the reactions characteristic of benzoic acid.

These observations show distinctly that the oil in question did not contain any cinnamylcocaine. It has already been stated that judging from the platinum salt of hygrine its formula is $C_{12}H_{13}N$, and that it may be a trimethylchinoline, corresponding to methylated piperidine; but I shall return to this subject on a future occasion.

From the bases of true coca there was obtained, after separating cocaine, a fraction which had the same percentage composition as cocamine, but differed from that substance by its solubility in petroleum spirit and in other particulars. That substance I termed cocaidine. On decomposing it with dilute hydrochloric acid it was however ascertained that a sensible quantity of cocaic acid was formed, as well as other acids and an oily product that was not readily decomposed by hydrochloric acid. Consequently cocaidine is a mixture, but its further investigation must be deferred for want of material. From the solution out of which that mixture had been precipitated by ammonia oily bases could be obtained as above described, which on boiling with dilute hydrochloric acid behaved in the same manner as those obtained from the other kind of coca, with this difference, however, that the principal part of the acid product in this case was benzoic acid.

From my investigation I consider I am justified in concluding that the "amorphous" bases from true coca consist chiefly of benzoyl compounds of an oily non-volatile base, together with some cocamine, while, on the contrary, those obtained from the other kind of coca—

* The occurrence of cinnamic acid among the products of decomposition of coca bases was known to me long before the publication of the fact by Frankfeld.

the so-called Truxillo—consist essentially of cocamine and the cinnamyl compounds of that oily base; also that cocamine is in both cases accompanied by another base containing two atoms less hydrogen, which I have named cocrylamine. In both cases the amorphous bases yield some hygrine, but whether it be a product or an educt I have not been able to decide.

FLORAL FEATURES OF THE AMAZON VALLEY.*

BY DR. H. H. RUSBY.

The valley of the Amazon is surrounded on three sides by mountains, being open upon the northeast towards the Atlantic. It therefore offers two distinct regions for our consideration; the vast, forest covered plains which constitute the greater portion of its area, and the high mountain slopes which surround it, and which give origin and character to the mightiest river-system in the world. The mountains upon the north and southeast are comparatively low, much of them being in fact little more than large hills. But upon the west the wall of the Andes is high and steep to the last degree. This wall, throughout its entire length of more than 2000 miles, presents a great uniformity of floral conditions. Towards the south, it is true, the same species or classes of species do not reach quite so great an elevation, but the general succession encountered in passing from summit to base is very much the same at all points. If we shall follow one of the main tributaries of the Amazon from its remotest source among the mountains, we shall gain a thoroughly good idea of all the floral elements of the region.

We start, then, from a broad open plain in northern Bolivia, elevated some 13,000 feet above the sea. It is surrounded on all sides by mountains, their tops snow covered during the greater portion of the year. Strangely enough, they bear their chief burden of snow and ice during the summer months, not because of the temperature, but on account of a greater supply of moisture at that time. From their sides, a number of small streams descend to the plain upon which we are standing, unite at its lower edge, and run off through a gap in the mountains. There is very little of vegetation upon the mountain sides, but the plain presents the appearance of a rich meadow, covered with poa, agrostis and other dwarf grasses. Upon closer examination, however, we find that there are no grasses, what we have mistaken for them being a dense growth of dwarf Compositæ, chiefly liabum and hypochaeris. Soft and inviting as the couch appears, we find, on attempting to recline upon it, that each erect leaf is tipped with a stout needle-like spine, and we are forcibly reminded of the cowboy's favourite saying, "You'll find me a nice sort of cactus to sit down upon." This armature is an efficient protection for these plants against the herds of llamas and alpacas which roam the plain. These animals feed chiefly, or at least very largely, upon a tender verdure which grows half submerged in the broad and shallow streams. If we look upon this pseudo-meadow in the early morning, we find it bright with the handsome white and purple dandelion-like flowers belonging to its spring vegetation. But, like the dandelion, they close upon the appearance of the midday sun. All vegetation here is dwarf, scarcely anything rising more than an inch or two above the ground. Among the dandelion-like plants grow diminutive lupines, painted-cups, and St. John's worts. The little bogs, instead of being covered, as among us, with sedges and rushes, are densely clothed with a fine creeping adesmia, not only its leaves, but every one of its tiny pea-blossom-like flowers pressed tightly against the cold ground. For cold as the ground appears in the bright sunshine, it yields a genial warmth during the cold night which follows. Among these vines grows a tiny mallow, so dwarfed and matted as to appear at a little distance precisely like a lichen. The drier places near the hills sparkle with gentians, not like ours, tall and slender, but dwarfed to an inch in height, the showy flower by far the largest part of them.

If now we were to pass to the westward and cross the mountain range before us, a very different scene would present itself, for this range separates the luxuriant basin of the Amazon from the dry and barren slope of the Pacific. But instead of this we turn to the eastward, and walk beside the little stream to the edge of the meadow. With difficulty we follow it for a little way as it rushes and leaps along its rocky bed to escape from the encircling mountains. Rounding the base of a huge rock, we are stopped upon the verge of a precipice four times as high as the Washington monument, and are confronted by a view as awful as it is magnificent. A great cleft appears through the mountains, its sickening depth making it appear contracted, although a good-sized village could be accommodated within it. Its recesses are dark and silent except for the rushing of streams, and its walls are black and bare. Here and there a snowy peak is projected above them, and shows rosy-red by the morning or evening light. With a glass we can discern some herbage among the rocks below, and we hastily seek a way of descending. Only with infinite difficulty and constant peril is this accomplished, but after a hard day's work we stand among the fallen rocks at the base of the cataract and admire the beautiful soft mosses which cover the rocks in patches. Vegetation is scarce at the beginning of the canon, because of a lack of permanent deposits of soil. But soon we encounter a species of atropa with beautiful pendulous golden flowers. Next occurs a little plant growing in dense moss-like patches and covered with scarlet bells. It is an *Ourisia* in the Digitalis family. Soon the canon broadens into a valley, the stream becomes rigidly confined within its banks, and a broad margin is afforded upon either side where flowering species, both herbaceous and shrubby, rapidly increase in number. There are beautiful mossy banks thickly beset with woodsia, aspidium, acrostichum, and other ferns. There are grassy places where we may gather violets, cudweed and ladies' bed-straw, and there are copses where shrubby solanums may be gathered in the greatest variety.

At first all these species are delicate, belonging to a temperate clime; but when we have passed the 11,000 foot level a rapid change is noted in the character of the herbage. The herbs become stouter and the leaves tougher and more shining, and soon, turning a bend in the road, we look for miles down a beautiful open valley rich with the evergreen foliage of the tropics. But we go not down this beautiful valley, as the way is too tortuous and long. We will climb the mountain on our left, descend and cross one or two smaller ridges below, and come again upon our little stream, now grown to a furious mountain torrent. For an entire day we pursue our varying way across these little ridges, encountering treasures for the herbarium at every step. At length ascending the last range which obstructs our view of the great valley, a magnificent spectacle confronts us.

Standing upon one of the commanding summits half way up the eastern Andean slope, and surveying the hills and valleys spread before him, the traveller would scarcely suspect that he is overlooking one of the roughest and most jagged sections of country in the world; yet such is the case. The steepness of these descents has been attested by all travellers; but no word picture can convey an idea of their real character. There are places where for almost an entire day the traveller descends as though he were passing down a

* Lecture delivered at the Massachusetts College of Pharmacy, March 6. From the *New England Druggist*, April.

flight of steps, and steps so abrupt that at first sight it would seem impossible that either man or beast could surmount them. Yet, as I have stated, as we look about over these precipitous ridges we would not suspect that their steepness is really so great as it is. Vegetation has performed wonders in toning down the jagged peaks to softness. Stretching away in every direction is an expanse of living green. Valley succeeds valley, and hill succeeds hill in a never ending succession, until the panorama fades away in the distance. Everyone has observed that when the ground is covered with snow, the eye fails to detect the elevations and depressions upon its surface. In this case the green of the vegetation produces the same effect. The precipices, covered as they are with trailing vines, look like gentle declivities; the sharp peaks present themselves only as rounded domes, and that which is, in fact, a deep canon with steep sides, appears filled up until it looks like a pleasant valley. In fact the eye detects nothing but a mass of verdure, which to all appearances might have been tossed about by some gigantic hand, and left piled in ridges and masses. The cataracts, however, soon undeceive us. We may see a dozen beautiful cascades all in view at the same time. We see them leaping out from a mass of verdure, falling perhaps two or three hundred feet, and disappearing again among the forests, only to reappear at a short distance below and take another wild leap into the greater depths which await them. Sometimes we are obliged to cross one of these streams, usually on a bridge not more than six or eight feet in width, consisting of two tree trunks felled across the chasm and covered with branches of trees which bear a thin layer of earth. There are no sides of any kind, and the crazy structure wavers and swings frightfully as we cross it. Below us we can hear, but we cannot see, so great is the depth of the chasm, the rushing stream.

Now we pass what seems to us a hedge of coffee planted by the roadside, and peering cautiously down among the mass of coffee shrubs, we find that they form, not a hedge but only the upper row of a plantation which stretches downward, covering a declivity so steep that we marvel how the gardener can hold his position while working among them.

Having descended to an elevation of between 5000 and 4000 feet, we may consider that we have reached the typical region of the tropical mountain slopes, and here we will pause and sketch the second of our pen pictures. The forest is of heavy timber, for the most part not tall and straight, as we shall find it in the valley below, but gnarled and twisted, and in broadly spreading forms, resembling our white and scarlet oaks. The trunks and larger branches are usually entirely hidden by the numerous parasites which infest them. These parasites belong to many classes, but mosses, ferns, orchards, oriads and bromeliads predominate. Some of the bromeliads are very showy. They resemble our giant century plants, single specimens often weighing more than a hundred pounds. Their leaves and floral bracts are sometimes of the most brilliant blue or crimson. As to the orchids, neither pen nor brush can portray them. None of the brilliantly coloured plates in our illustrated works on these plants are quite so brilliant as the flowers themselves in a wild state. It is not uncommon to collect a rose or scarlet panicle nearly a half yard in length by half as broad. Some of them are not showy—often, indeed, of a pure white, but load the air with their fragrance. But these smaller plants are not the only parasites. Great vines cover all the trees, and while finding thus their own support, serve a useful purpose in binding together the trees and assisting them to maintain their precarious footing upon the steep slopes. Occasionally, however, even their strength is insufficient to uphold the unwieldy monster, laden with its numerous colonists and heavy with rain. Slowly it yields, and suddenly a terrific snap is heard, followed by a deafening crash as the falling mass tears down the mountain side carrying all before it—an avalanche of vegetation.

Where the steepness is so great that a heavy forest growth is impossible, a different picture, less grand and imposing, but far more beautiful, presents itself. Standing among a mass of rocks we lean against the trunk of a handsome palm and look down through the drooping fronds of tall tree ferns and arches of the graceful mountain bamboo. The rich green of the slopes about us is broken here and there by a patch of brilliant colour where a rosy-purple tree mallow, a golden vochysia, or a snowy bignoniad has burst into bloom. When we have been tired of looking at these larger specimens of Flora's handiwork, we note the less conspicuous, but equally elegant, species which cover the ground and rocks about us. We can wade knee deep through beds of begonias and calceolarias, while from the rocks are falling the most beautiful orchids, ferns and amaryllids—the whole shaded by a hedge of graceful fuchsias.

This region is the home of the cinchona and coca plants, and the clearing of the land for their plantations is an arduous and exciting task. The labour of felling the trees is much less than upon the level land below, because of the manner in which a few cut from above may be made to carry many others with them in their fall. Great difficulty is experienced, however, in securing level spaces upon which to locate the buildings and the nursery-beds. In performing the necessary labour Indians are brought down from the table-lands above, the natives of the slope being lazy and worthless vagabands. When the cinchona plants possess from two to five leaves they are transplanted to the steep slopes, which have been thoroughly cleared for their reception. Here they are carefully weeded and tended until they have become large enough to shadow all the ground. As soon as the bark is in possession of its full percentage of quinine, the trees usually being from six to nine years of age, it is cut, dried, and shipped to market. Although this cultivated Bolivian bark is, generally speaking, a superior article, yet the cheaper product of India is largely driving it from the market. A mountain slope thickly planted with cinchona trees, their graceful panicles of snowy flowers conspicuous among the satiny green and purple foliage, is an exceedingly beautiful sight. The air at this time is sweet with the odour of the flowers, and musical with the hum of myriads of sparkling humming-birds.

The coca-plants are started in much the same way, but must be planted in rows or terraced, and much less steep, exposures. It becomes a shrub of some six or eight feet, and its leaves are universally chewed by the Indians, enabling them to undergo, with comparatively little inconvenience, their toilsome journeys across the mountains. The principal fruits of the tropics grow at this elevation 4000 to 5000 feet, but do not reach their greatest perfection until we have descended to 3000 or 2500. At the latter level we find the cacao, from whose seeds chocolate is made, yielding the richest product to be found in the world. The orange, sweet and luscious beyond description, may be gathered by the bushel on every hacienda. The pacay, the custard apple, the grenadilla and the paw-paw load all the stalls in the market place of the little towns. But the banana is the fruit of fruits among these people, and in both the green and the mature state affords the chief article of their food. Of the eating banana, the "madura" of the tropics, our markets know nothing. Our bananas are chiefly the cooking bananas in the regions where they grow. They are cooked by boiling, frying and roasting. Ripe bananas are sliced lengthwise and fried in butter or olive oil. Partially ripe ones are boiled for two or three minutes with the skin on and eaten with honey

or syrup. Perfectly green ones are peeled and roasted in the ashes; eaten with butter they constitute one of the most delicious and wholesome of all starchy foods. The varieties for eating ripe in a raw condition are numerous, named, and of entirely distinct flavours. In general the smaller they are the more delicious. The finest of all is the little lady-finger, with the skin scarcely thicker than brown paper.

At three thousand feet most of the streams become navigable by means of rafts. Two of these we lash together side by side, and manned by six strong Indians it goes spinning down the rapid tide. The ride is an exciting one. If the depth were not, as it is, sufficient to swallow up our precious cargo, and the lives on board, the current is sufficient to dash our lives out against the boulders in the stream or upon the rocky banks. Skilfully our boatmen avoid the dangerous obstructions and dexterously they catch the raft upon their long poles thrust against the cliff upon which we seem rushing, and throw it back in safety to the middle of the stream. Occasionally we shoot a rapid or leap a fall amidst dangers most appalling, and again we move evenly across a smooth expanse. In eight hours we have gone ninety miles, and the steepest of our descent is passed. The scenery, of course, is of the richest, and we are almost sated with the endless succession of palm-covered mountains, fern draped cliffs and fringing border of brilliantly coloured flowers. For eight days we pursue this journey, and then we glide smoothly through a cleft in a low rocky ridge, and the remotest portion of the Andes lies behind us.

(*To be concluded.*)

A SIMPLE METHOD FOR THE DETECTION OF SUGAR IN URINE.*

BY H. HAGER.

The following method was experimented with several years since, but was not put to a sufficiently practical use, and so received but slight attention. Recently, however, being busy in the examination of diabetic urine, I again took up this almost forgotten method, and with it obtained the most happy results. To physicians particularly this method will prove acceptable, inasmuch as it can be carried out in every room in which a kerosene lamp with a round burner is at hand.

Take a strip of filter paper or of blotting paper about 3 cm. wide and of moderate thickness, and with a piece of wood or a glass rod place a drop of urine on the paper. Then heat this over the kerosene lamp for a few minutes, so that neither the paper nor the spot of urine are changed by the heat, and that the paper does not get brown. This can be accomplished with certainty by having the flame not more than 3 mm. high, while the narrowest part of the chimney should be about 18 or 20 cm. above the flame, or project above it about a hand's span. The paper with the spot of urine should then be held about 2·5 cm. above the opening of the chimney, the side on which the spot is, being held towards the lamp. If the chimney is shorter, reaching only about 15 cm. above the flame, the paper should be held about 3·5 to 4 cm. above the mouth of the chimney.

If the urine contains no sugar it leaves in drying either a scarcely perceptible or faintly yellowish spot. If it contains albumen the spot left is from a yellowish to a pronounced yellow colour, and in the latter case frequently with a reddish tinge. If the urine contains sugar (dextrose) the spot is a brownish-yellow, a yellowish-brown, or a brown colour, according to the quantity of sugar present.

On observing the spot through a magnifying glass by transmitted light (either sun or lamp light) it will be seen that the edge of the spot is darker with dark spots, while normal urine or urine containing only albumen is either free from these dark spots or they are scarcely discernible.

It is necessary for one to carry out this process several times in order to obtain the requisite practice. If no diabetic urine is obtainable, a substitute may be prepared by adding to about 12 c.c. of normal urine, 5 to 7 drops of syrup of dextrose, or 1 c.c. of honey which has been previously washed with absolute alcohol.

In order to make this test when visiting a patient it is only necessary for the physician to carry in his pocket a few pieces of moderately heavy filter paper.

This test may be modified as follows: with a sliver of wood or a small glass rod place a small, but high drop of urine near one end of a microscopist's glass slip, about 2 cm. wide by 5 or 6 cm. long. A thin piece of window glass of about the same dimensions will answer. Now add another small drop of urine on top of the first, and lay away in a warm place until the drop dries. Then hold the glass above a lamp chimney and heat it, cautiously moving it to and fro across the opening of the chimney.

In this case the flame should be about 3 mm. high, and the glass should be held about 2 cm. above the mouth of the chimney, thus having a stronger heat than when paper is used. After heating about three or four minutes, observe the spot over white paper, both by direct and by transmitted light, and then in both lights by the aid of a magnifying glass.

With normal urine the spot is whitish with a grey opaque border (about 0·6 to 1 mm. wide). When albumen is present, the difference between the edge and the middle is less clearly marked, the latter not being translucent in transmitted light. The spot left by diabetic urine is brown, especially on its edge, which is about 1 or 1·2 mm. wide. By the aid of a magnifying glass brown particles of the roasted sugar may be observed, particularly around the edge. This spot especially should be examined with a magnifying glass by transmitted light.

After having once carried out this process, it will be found quite easy of execution.

Either of these tests will prove valuable as a preliminary test and also as confirmatory to the results obtained with alkaline bismuth solution. The latter test will no doubt still be preferred by the chemist.

This simple process can be used by the physician only to determine the presence of sugar, its quantitative estimation being as heretofore turned over to the chemist or the pharmacist.

* From the Berlin *Pharmaceutische Zeitung*. Reprinted from the *Druggist's Circular*, April.

DEVELOPMENT OF NITROGEN IN PUTREFACTION.

According to a paper published in the *Landwirthschaftliche Jahrbücher*, a series of experiments conducted by Herr B. Tacke have led him to a conclusion opposed to the ordinary view that free nitrogen can result from the decomposition of vegetable substances only when the oxygen of the atmosphere is excluded. It is true that if the decaying substances do not contain any nitrates no nitrogen is set free, whether free oxygen be present or not. But if the substance contains a nitrate, then, whether in the presence or in the absence of free oxygen, the nitric acid is either reduced to the state of free nitrogen, or one of the lower oxides of nitrogen N_2O, NO or N_2O_3 is formed. The ordinary gaseous products of the decomposition of vegetable substances are, according to circumstances, varying mixtures of carbonic acid, hydrogen, sulphuretted hydrogen, and marsh gas. The microbes by whose agency the reduction of the nitrates is effected do not bring about any elimination of free hydrogen.

The Pharmaceutical Journal.

SATURDAY, APRIL 27, 1889.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary, 17, Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE TESTING OF GLASS VESSELS.

THOSE who are in the habit of handling glass vessels will have frequently noticed that coloured organic solutions, when long kept in them, alter their colour. In this way red litmus becomes in time blue, and solutions of phenolphthalein or hæmatoxylin purple-red. These changes are due to the separation of alkali from the glass by the action of water, and in many other cases apparently accidental alteration of the colour of chemical preparations may be caused in the same manner. In a paper recently read before the Berlin Chemical Society this subject has been discussed in regard to the determination of the characters of glass for certain technical purposes, and in the first instance it was attempted to effect that object by the use of iodine and starch. As previously shown by the author, F. MYLIUS, the formation of iodide of starch requires the presence of hydriodic acid or an iodide. Hence the coloration of iodine and starch will take place on the addition of a substance capable of converting iodine into hydriodic acid, and the same effect is produced by the addition of a trace of alkali. Thus, when to a mixture of clear starch solution and iodine solution some very dilute solution of silver acetate is added until the mixture is rendered colourless, or only yellowish, and then some powdered glass is added there is an immediate blue coloration. In this way comparisons may be made with different kinds of glass in regard to their susceptibility to decomposition, but the difficulties attending the application of this method are too great for most purposes. Weber's method of exposing glass to the action of hydrochloric acid gas is also uncertain, except in the hands of very experienced operators. In place of these methods it is proposed to take advantage of the fact that glass is hygroscopic in regard to hydrated ether, and to make the absorption of water, as well as the simultaneous liberation of alkali, perceptible by the use of a material that is coloured by alkali. For that purpose eosin has been employed. The alkaline compound of eosin is insoluble in ether, but eosin is soluble; and as the coloration produced by the liberated alkali is equivalent to the quantity liberated, a means is thus afforded of measuring the quality of glass. In carrying out the operation the glass vessel to be tested is filled with hydrated ether and some weak eosin solution added. It is then left for twenty-four hours, and at the end of that time washed with ether, when there will be found on the surface of the glass a coloured layer of intensity proportionate to the decomposition that has taken place. In all cases the glass vessels must be carefully cleansed beforehand by rinsing with water, alcohol, and ether, and they must while still moist with ether be brought into contact at once with the eosin solution. Some kinds of glass are acted upon by water so rapidly that they are coloured immediately by the eosin solution, but with glass of better quality the coloration does not take place until after several hours. The eosin solution for this purpose is to be prepared by dissolving iodocosin in one thousand parts of water. The application of this method of testing glass has been found very useful in regard to glass instruments of various kinds, and it is considered by the author that in many instances it may prove useful in chemical and physical laboratories, where the quality of glass tubes and vessels is frequently a matter of importance.

THE RAILWAY RATES QUESTION.

WE learn that the Committee appointed by the Chemical Section of the London Chamber of Commerce, consisting of Messrs. R. BARRON, W. H. FRANCIS, DAVID HOWARD, LESCHER, TYRER and UMNEY (of London), and Messrs. BARCLAY (Birmingham), EVANS (Liverpool), and WYLEY (Coventry), has now discussed the above subject in relation to the Drug Trade, and is prepared to place before the trade such points as are thought necessary to be drafted for the Railway Companies and the Board of Trade at a meeting to be held at the London Chamber of Commerce, Botolph House, Eastcheap, on Monday next, at 2 p.m., when all who are interested in the subject, whether wholesale druggists, patent medicine vendors, or druggists' sundriesmen, etc., are invited to attend.

We are glad to be able to announce that the sum of £100 has been received from Mr. William Scott Brown, of Manchester, as a donation to the Benevolent Fund.

* * *

A "call" has been issued for a General Convention to assemble in Washington, on May 7, 1890, for the purpose of "providing for a revision and publication of the Pharmacopœia of the United States of America." Meantime all incorporated medical and pharmaceutical colleges and associations that desire to be represented on that occasion have to send an intimation to that effect to the President of the Convention, Dr. Amory.

* * *

A meeting of the Chemical Society will be held on Thursday, May 2, when papers will be read on "Thiophosphoryl Fluoride," by Professor Thorpe and Mr. Hambly, and "The Boiling Points of Potassium and Sodium," by Mr. E. P. Perman.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN EDINBURGH.

April 16, 17, 18, 23 *and* 24, 1889.

Present on each day—Messrs. Clark, Dott, Gibson, Gilmour, Kinninmont, Nesbit, Maben and Stephenson.

Professor Sir Douglas Maclagan was present on the 17th, and 23rd, on behalf of the Privy Council.

MAJOR EXAMINATION.

23*rd.*—*Two* candidates were examined. *One* failed. The undermentioned passed, and was declared qualified to be registered as a Pharmaceutical Chemist:—

Coats, John Thomson .....Edinburgh.

MINOR EXAMINATION.

16*th.*—*Thirteen* candidates were examined. *Six* failed. The undermentioned *seven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Askew, John Robert .....Carnforth.
Bates, John .....Manchester.
Blenkiron, Jeremy .....Shildon.
Cargill, David Allan .....Arbroath.
Cowie, William Beaverly .....Mains of Newrain.
Dawson, Alexander Fraser ...Aberdeen.
Durno, Alexander Emslie .....Aberdeen.

17*th.*—*Twelve* candidates were examined. *Seven* failed. The undermentioned *five* passed, and were declared qualified to be registered as Chemists and Druggists:—

Evans, Stephen William .....Sale.
Hall, John.....Aberdeen.
Hollely, Thomas Lowe .....Ollerton.
Horne, Thomas .....Kinross.
Hurst, Richard Proudman ...Ramsbottom.

18*th.*—*Twelve* candidates were examined. *Four* failed. The undermentioned *eight* passed, and were declared qualified to be registered as Chemists and Druggists:—

Jewell, Arthur Furniss .....Liverpool.
Law, James .....Insch.
Laurence, John, junr.....Glasgow.
Lothian, John .....Coldstream.
McCurrie, John .....Port Bannantyre.
McDonald, George .....Glasgow.
Maley, George Joughin .....Douglas.
Martin, John .....St. Stythians.

23*rd.* — *Twelve* candidates were examined. *Four* failed. The undermentioned *eight* passed, and were declared qualified to be registered as Chemists and Druggists:—

Melrose, William.....Greenock.
Menzies, George Wilson .....Dalbeattie.
Milne, Henry .....Aberdeen.
Mitchell, Robert Harry .....Rutherglen.
Moxon, John Lawrence.....Wellingborough.
Robertson, Robert .....Leith.
Sinclair, Neil Crawford.....Greenock.
Smart, James .....Edinburgh.

24*th.*—*Thirteen* candidates were examined. *Seven* failed. The undermentioned *six* passed, and were declared qualified to be registered as Chemists and Druggists:—

Nicholson, Allen Macdonald...Creetown.
Smith, Alexander .....Elgin.
Stirling, David Alexander.....Dunoon.
Walker, John Brown .....North Vennel.
Weatherston, Francis Beattie Peebles.
Williams, William .....Carnarvon.

MODIFIED EXAMINATION.

24*th.*—*One* candidate was examined, and was declared qualified to be registered as a Chemist and Druggist:—

Lawford, Charles William ...London.

MEETING OF THE EXECUTIVE OF THE NORTH BRITISH BRANCH.

A meeting of the Executive of the North British Branch was held in the Society's House, 36, York Place, Edinburgh, on Wednesday, April 24, at 4 p.m.

Present—Messrs. Boa, Gibson, Gilmour, Mackenzie and Stephenson, Edinburgh: Fisher, Dunfermline; Hardie, Dundee; Kinninmont, Glasgow; Lawrence, Oban; Maben, Hawick; Nesbit, Portobello; Storrar, Kirkcaldy; Strachan, Aberdeen; and Watt, Haddington.

Apologies for absence were received from Messrs. Frazer, Glasgow; Mackay, Edinburgh; and Paterson, Aberdeen.

The minutes of last meeting were read and approved.

The report of the General Purposes Committee was read and adopted.

The following resolution was unanimously agreed to:—

"That the next election of Executive take place on Wednesday, June 20, and that the Chairman and Vice-Chairman be appointed Scrutineers of the voting papers, with power to add to their number."

The draft report to the Council was considered in Committee, and on resuming it was adopted on the motion of the Chairman, seconded by the Vice-Chairman.

The meeting then closed.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The fourth general meeting of the fortieth session was held at the Royal Institution on Thursday afternoon, April 11, the President, Mr. A. H. Samuel, F.C.S., in the chair.

The minutes of the previous meeting were read and confirmed.

Railway Rates.

The President said they had been called together to consider several important topics. These were the proposed new railway rates and the carriage of drugs, the sale of medicated wines by chemists, and the Pharmacy Acts Amendment Bill. All these subjects were of the highest importance. In speaking of the new railway rates Bill, he said, that by an Act passed during the last Parliamentary Session, called the "Railway and Canal Traffic Act, 1888," the railway and canal companies of Great Britain were instructed to deposit with the Board of Trade, within six months' time, complete specifications of the maximum charges which they desired to be empowered to make on the various classes of merchandize forwarded over their lines. All the companies have agreed upon one common classification of goods, but the companies have found it impossible to agree upon a uniform scale of charges, and there was a wide divergence in their tariffs which they ask to be permitted to adopt. As regarded that portion of their new proposed maximum rates—in which they, as chemists and druggists, are more especially interested, namely, the rate on drugs and pharmaceutical preparations, as well as the rate on returned empty containers and packages—they found that under the revised classification now agreed upon by the railway companies, nearly all pharmaceutical goods were incorporated in the highest sections, or rather in those in which the highest scale of charge per ton could be imposed. Heavy chemicals and some drysalteries, it is true, were placed in classes 1, 2, and 3; but oils, such as druggists use, are placed in the 4th class; and all unenumerated drugs and chemicals which comprise pharmaceutical preparations were placed in

the 5th or highest class of rates. Again, empty packages and containers were placed in the 5th or highest lots. The proposals were so exhorbitant in many cases, and so unfair to the drug trade of the United Kingdom, that a determined opposition had been set on foot by the leading members of the metropolis, and in order that all interested in Liverpool might have an opportunity of expressing their views and determining on their course of action, this meeting has been called. He was pleased to see there several prominent members of the retail and wholesale drug trade, and among them Mr. John J. Evans, of the firm of Messrs. Evans, Sons and Company, as he had been appointed one of the subcommittee of the Chemical Section of the London Chamber of Commerce, to organize an emphatic opposition to the proposed rates, and no doubt he would be able to put before them that day actual figures showing the difference between the existing rates and those proposed by the railway companies, and how they will affect the large centres of population throughout the United Kingdom.

Mr. J. J. Evans very fully explained the Bill, and said that when the Act was passed on August 10, 1888, the impression on the mind of the public was that something was done in their interests, and that lower, or at any rate a more equitable scale of charges for carriage would result. Those hopes had proved delusive, inasmuch as the railway companies had taken the opportunity of enormously raising their maximum rates. They told them that they did not intend to adopt those new rates, but would charge as before. No doubt when they had the competition of sea or canal carriage they would do so, but when they had no opposition do not let them suppose that they would not exact to the uttermost farthing the rate they had power to levy. As they were all aware, the wholesale drug and chemical trade had jointly taken the matter up, and a sub-committee (of which he was a member) appointed by the Chemical Section of the London Chamber of Commerce, intended to formally lodge objections with the Board of Trade. He was very glad that Association had taken an interest in the matter, because a strong protest from the Liverpool Chemists' Association to the Board of Trade with objections would have weight, and would strengthen the hands of the committee acting in London. The railway companies' new classification did not seem to be made with that care and discrimination which they would expect from such experienced corporations. They could only suppose that their own interests, rather than the general interests of the trading community and the public, had influenced them in framing their schedules. They heard a constant cry of dear physic, and now 5 per cent. to 10 per cent. was by the action of the railway companies in the interest of the shareholders to be added to the cost. What the railway companies had taken into account appeared to him to be increased dividends for their shareholders. At the annual meeting of the London and North Western Railway the Chairman was asked how these new rates would affect the profits of the company. The Chairman was too wideawake to commit himself, and would not say yea or nay. The Great Western Railway Chairman at the annual meeting of this company was not so diplomatic, and admitted that they would be an advantage to his company if they became law. Now, as interested in the carrying trade of the country, he (Mr. Evans) for one protested against these great monopolists being permitted by law to get their excessive rates out of the hard-worked traders of the land, and to swell dividends for the wealthy capitalists at the expense of the middle and labouring classes. It was preposterous that rates from Liverpool to London by rail should be more than from Liverpool to Callao (Peru) by sailer. Rates should also be equitable and without preferences, mileage being the chief element of consideration. The matter of terminal charges was for the railway companies to apportion over their whole system, and not to tax any town or district, because of special circumstances, to the benefit of others. In classification several factors had to be taken into account, but one special reason in connection with manufactured drugs and many chemicals why rates of carriage should be low was that they were made with spirit already heavily taxed, rendering medicine dearer. That caused a heavy burden on a large class of people and on charitable institutions. Higher classification would tend to raise the price still higher to the public, and therefore it was a manifest injustice to put them in class five amongst the luxuries. He moved that a small committee should be appointed to draw up a list of objections to the proposed maximum rates of the railway companies, to to be presented to the Board of Trade, signed by the Chairman and Secretary, and to be lodged within the prescribed time through the Committee appointed by the Chemical Section of the London Chamber of Commerce.

Mr. T. F. Abraham seconded the motion, but thought too much alarm was being raised about this matter. Railways never had charged their maximum rates, and were not likely to do so. Competition might be relied on to prevent their doing so.

The Secretary (Mr. Ward) pointed out that that was a question that affected the whole trade as a body and throughout the country. It affected the rural districts where there was only one railway company, and he contended the railway companies would charge the maximum rates where there was no fear of any opposition. He therefore cordially supported the motion.

A lengthy discussion ensued, in the course of which Mr. A. C. Abraham said that in regard to terminal charges they were in a great measure for the storage of cotton, and were made high for the convenience of cotton manufacturers.

The motion was carried unanimously, and on the motion of Mr. J. J. Evans, the following Committee was appointed to draw up objections to the maximum rates proposed by the railway companies :—The President and Messrs. J. J. Evans, Symes, T. F. Abraham, Wellings and Bain.

The Sale of Medicated Wines.

Mr. T. F. Abraham said the difficulties connected with the supply of various medicines so combined as to come under the Excise definition of "Wines" were known doubtless to all present, and therefore required nothing further than a mere reference from him. They were all loyal subjects, anxious to fulfil their legal obligations, but at the same time it was very hard that unless they chose to call themselves wine-merchants, and submit to the various regulations applicable to such traders, they were constantly in the difficulty of being unable to supply the medicine prescribed by the medical attendant, simply because that medicine was combined in a special and agreeable manner. Another difficulty was that even supposing the chemist had taken out a wine licence, if he were the holder of a methylated spirit licence, special arrangements were required. He therefore had pleasure in proposing that a petition be drawn up and presented to the Board of Inland Revenue, praying the Board to arrange for the imposition of an *ad valorem* stamp duty on all medicinal preparations falling under the Excise definition of "Wines," permitting such "Wines" to be sold by any person holding a licence for the sale of patent medicines.

Mr. A. C. Abraham said that when he originally introduced this subject in Committee his proposition was to get associations throughout the country to join in a general movement, and he did not think much good would be done unless this course was adopted.

Mr. T. F. Abraham, however, said he had no faith in the Pharmaceutical Society in such matters as this.

Mr. John Bain, Honorary Secretary, seconded the motion, which was supported by Messrs. Mackinlay and Dickens. The latter said their progress would be very slow if they relied on the agency of the Pharmaceutical Society in matters of this kind.

Dr. Symes thought the Inland Revenue authorities might be expected to give consideration to such a representation as was suggested, because a very unfair responsibility was thrown on chemists by the present system.

The motion was carried.

The Curriculum Bill.

This was the last subject on the agenda paper. It was introduced by—

Dr. Symes, who said the Pharmacy Acts Amendment Bill (more commonly known as the Curriculum Bill), now awaiting a second reading in the House of Commons, aims to enable the Council of the Pharmaceutical Society to frame a curriculum, and to insist on a compulsory course of study at certain approved colleges or schools for all students who shall in future aspire to enter the calling. From the little interest taken in this matter by the trade generally it was clearly regarded as a measure which affected future generations only, and about which men in business need not concern themselves. Even were that so, it was scarcely consistent with duty that they should be quite regardless of the future, or place themselves in the position of the Irish member of Parliament who said he had "heard a good deal about what we were to do for posterity; would some one be good enough to inform him what posterity had done for us?" He did not wish to be factious or to raise up opposition to anything which had a preponderance of good in it; but they should consider, as intelligent men, how this was likely to affect either their interests or those of any future generation. Sketching the history of the movement, the speaker referred to the criticisms of cramming for examinations which had been made by Professor Attfield and others, and said that some seven or eight years ago Mr. Schacht in particular, and the Council in general (himself included), became impressed with the idea that it was necessary to do something to assist the examiners in discriminating between crammed and well-trained men. A remedy had already been prepared, and only awaited adoption. That remedy was the curriculum. Cooked up with a little spice and swallowed whole, it was to prove a panacea for cramming and much more. It was to make the training of students more thorough, the knowledge they acquired more lasting. It was to benefit not only a school or *bonâ fide* schools in London, but also those in the provinces. When these were languishing it was to be the refreshing shower and fertilizer which was to quicken them into vigorous growth. When in important centres they were absent it was to be the germ from which they were to spring into existence. It was not only to confer educational advantages, but to raise up centres of social and intellectual intercourse throughout the country. And last, though not least, it was said in whispers and enigmas that by increasing the difficulties of entering the business we should reduce our numbers, diminish competition, increase our returns, and of course secure larger profits. All this was to be attained by a modification of the bye-laws, but the Privy Council refused its approval, and the Society decided to go to Parliament for the necessary powers. It might be argued that what was worth attempting by means of bye-laws must be so by Act of Parliament, and if we thought a curriculum desirable years ago it must be so still. But they had grown older, and it might be wiser, during that time. There were many more irons in the fire at Bloomsbury Square than there were seven years since, and the Society could no longer afford to carry out the scheme in its entirety, and denuded of its accompanying advantages it was but the mere ghost of its former self. The late Dr. Greenhow said again and again that the only compulsory training necessary was that of apprenticeship, and the only modification of the examination required was to introduce more practical pharmacy into it. Dr. Symes confessed that at one time he regarded these views as rather heterodox, and he still believed that by good systematic training a bad man might be made into a good one, and a good one into a better, but he had come to the conclusion that the advantages of the curriculum alone, as it now stood, have been overrated by its most earnest advocates, and he doubted if it should be made compulsory unless equivalent advantages could be obtained. The legislation proposed was, in fact, one-sided, seeking to increase the difficulties of entrance into the field of pharmacy, but leaving large gaps in the hedges neglected and without effort to repair them. What was likely to result from such a condition of things? Our friends in the Dominion of Canada could supply the answer. The Ontario College of Pharmacy had a prosecuting committee, and in the last report of this committee it was stated that the efforts made to raise the standard of pharmacy had increased the number of evasions of the Act, and that unless the proposed amendments of the Act could be secured, instead of one drug store in seven, as at present, soon a large proportion of the drug stores would be nominally owned by doctors and run by unsuccessful candidates of the pharmaceutical examinations. In other words, the more difficult they made the entrance into pharmacy, without conserving the rights of those who practice it, the more did illicit trading increase. That was just what might be expected here. But was there no other method of preventing persons who had only acquired a superficial knowledge of their subjects from passing the examinations? Some two months ago the President of the Pharmaceutical Society stated that the proposed new syllabus of the examinations had been received from the examiners, and would at an early date be considered by the Council. As it had not yet been publicly discussed he could not say anything about it, except that if it was somewhat on the lines indicated by Dr. Greenhow, and required from the candidate more practical pharmacy, it would accomplish all that could be obtained from the proposed curriculum, without its objectionable features. In conclusion, Dr. Symes moved:—"That in the opinion of this meeting it is undesirable that the Pharmacy Acts Amendment Bill, in the form in which it is now before Parliament, should become law."

Mr. J. S. Ward in seconding the motion concluded that the Bill if it became law would prove hurtful to all whom it directly concerned, viz., future students, those already qualified and in business and the Pharmaceutical Society itself. He maintained that if the curriculum proposed and published some few years ago was enforced it would necessitate a ten months' course, or its equivalent, and this would very greatly enhance the cost of qualification, and he considered it very unfair to place such a burden upon future students and offer them nothing advantageous in return. He argued that, if enforced, the curriculum would seriously affect those already qualified and in business. It would especially affect chemists in country towns; because whereas they now worked their businesses in great part with apprentices, and thus saved the salaries of assistants, they would be unable to get apprentices, as the parents or guardians of these would naturally want to place them in a centre where recognized courses of instruction were provided. Another point to be considered was that many chemists had sons, and probably

intend the business to be the heritage of one of these, and what would happen if the curriculum Bill became law? Simply this; it would cost the father at least twice as much to qualify his boy for his heritage as it does under the present system, and yet, forsooth, the prize would be of no greater value than now. For do not let it be supposed that by thinning the number of chemists the trade would be better for those that remain. The drug trade was an open one, and any individual could open a drug store, or a dozen if he pleased, and any company real or bogus could do everything that the fully fledged chemist can. Consequently to thin the number of legitimate chemists would be to subject the remnant to the competition of outsiders of every description. These would increase as the field opened up and the competition from them would be far keener and more unscrupulous than that from the legitimate and qualified chemist. Lastly, how would the passing of this Act affect the Pharmaceutical Society itself? The chief sources of revenue to the Society were the examination fees and the annual subscriptions from members, associates, and apprentices, and the first effect of this Bill would be to diminish the number presenting themselves for examination and correspondingly cut down the amount received in fees, and the ultimate effect would be to very considerably thin the ranks of chemists and subscribers to the Society, and of course diminish the amount received in subscriptions, and with both its chief sources of revenue partly cut away how would the Society meet its many expenses? He considered the Council was pursuing a suicidal policy, one fraught with injury to everybody connected with the trade and the Society, and of very doubtful benefit even to those outsiders who would ultimately do the bulk of the drug trade throughout the country. In conclusion, he would like to ask Dr. Symes whether the unsatisfactory condition of the Society's School a few years since had not influenced the Council in bringing forward this question?

Dr. Symes, in reply, admitted that the School at Bloomsbury Square at the time was not in such a satisfactory state as the Council would have liked it, and that this consideration had some influence upon them. He said it had, however, much improved, and that this improvement had come about without the curriculum.

Mr. A. C. Abraham thought a university training for students was calculated to do good. Was it not a question of the Society's sound teaching *versus* cramming schools.

Mr. J. S. Ward contended that universities are not at present adapted to teaching pharmacy and training pharmacists. If the universities took the matter up, had special men as teachers, and granted a special degree to pharmacists, then, he should say, by all means get a university degree; but then where would be the necessity for the Pharmaceutical Society and its Board of Examiners. He contended that a well-trained and fully qualified pharmaceutical chemist was the man preeminently adapted for the training of pharmacists.

Dr. Symes said every attempt to teach pharmacy to university students had proved unsatisfactory.

The motion was put to the meeting and carried unanimously.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

A meeting of the Midland Counties Chemists' Association was held in the Physical Lecture Theatre at Mason College, Birmingham, on Tuesday, April 16, the President, Mr. G. E. Perry, in the chair. The following paper was read:—

ENERGY.

BY J. F. LIVERSEEGE, A.I.C.

All who have read the 'Arabian Nights' will remember the following tale:—

"We found ourselves struck with consternation and our fear increased when we saw the genie appear suddenly in the shape of a gigantic lion.

"'Thou shalt pay dearly,' said the lion, 'for the trouble thou hast given me in coming here.' In saying this he opened his horrible jaws and advanced forward to devour her; but she, being on her guard, jumped back and had just time to pull out a hair, and pronouncing two or three words she changed it into a sharp scythe with which she immediately cut the lion in two pieces through the middle.

"The two parts of the lion disappeared, and the head turned into a large scorpion. The princess then took the form of a serpent and fought the scorpion, which, finding itself defeated, changed into an eagle and flew away, but the serpent then became another eagle, black and large, and went in pursuit of it. We now lost sight of them for some time. Shortly after they had disappeared the earth opened before us, and a black and white cat appeared, the hairs of which stood quite on end, and which made a most horrible mewing. A black wolf followed directly after her and gave her no time to rest. The cat being thus hard pressed changed into a worm and hid itself in a pomegranate, which lay by accident on the ground; but the pomegranate swelled immediately and became as big as a gourd, which, lifting itself up to the roof of the gallery rolled there for some time. . . . It then fell down again into the court and broke into several pieces. The wolf had in the mean time transformed itself into a cock and now fell to picking up the seeds of the pomegranate one after another. . . . There was one lying on the brink of the canal. . . . which. . . . just as he was going to pick it up. . . . rolled into the fountain and became a little fish. The cock turned into a pike and pursued the small fish."

When we read this, we say, it is too wonderful to happen, nothing can make such marvellous changes as these, there are no genies; and yet all around us a wonderful genie is rapidly changing his form, and appearing almost instantaneously at distant places. The name of this genie is energy. What is energy? The general definition is "The power to do work or overcome resistance." The nature of energy philosophers cannot yet define, they can only point out its manifestations.

My definition of energy is "The connection of the sciences." Students learn at various classes chemistry, botany, electricity, optics, acoustics and physiology, but often forget that each is a study of a manifestation of energy and its results, or as geology, of its work in the past.

Some of the most interesting of the changes of energy I shall try to exhibit and describe to-night.

I will begin with chemistry, or rather the chemical force; two terms will be used, viz.:—chemical attraction, or combination, and chemical separation.

When chemical attraction occurs, energy is displayed, frequently as heat, but to produce chemical separation energy must be used. For example, if chalk is strongly heated carbonic anhydride is evolved and quick-lime remains, that is, chemical separation is performed; then, if the lime be left in an atmosphere of carbonic anhydride, the same amount of heat is produced by chemical combination forming chalk again.

Chemical attraction is frequently sufficiently intense to produce light and heat. This is the change which takes place in combustion, also in this experiment of throwing a mixture of finely divided lead and carbon (known as pyrophoric lead) into the air, when the chemical attraction is sufficiently violent to make the particles red hot. Other examples are the explosion of gunpowder, the spontaneous ignition of hay-stacks, flour-mills, lamp black, coal dust, etc. Violent chemical combination is also well shown by the bright light produced by the burning of this magnesium ribbon.

If oxygen and hydrogen combine the flash shows the

heat produced by the chemical combination; this is also shown by the intense heat of the oxo-hydrogen blowpipe flame. Chemical attraction may become electricity. If oxygen and hydrogen, instead of being exploded, are contained in separate vessels inverted over water, and are connected by a wire having platinum plates at the ends in the gases, chemical combination occurs and a current of electricity is produced in the wire. The same change occurs in voltaic batteries, the simplest form being a plate of copper and one of zinc placed in acidulated water and connected by wires. Chemical combination occurs and an electric current is produced; the many varieties of batteries use up the energy of chemical separation and change it into electrical energy.

We will now pass on to heat and its changes. Clausius' kinetic theory teaches us that everything is in motion, and that solids, liquids, and gases differ in the extent of this motion. The molecules of solids are supposed to have a backward and forward motion; the fact that they move is shown by the axles of railway carriages breaking after long use, owing to the particles having rearranged themselves so that the steel is no longer fibrous but crystalline. In liquids the molecules also roll or glide round each other; motion here may be proved by two liquids of different densities, as syrup and water, mixing of their own accord if left undisturbed. Gases move at a rate inversely proportional to their atomic weights, the velocity of a molecule of hydrogen being 6097 feet per second.

When a substance is heated the molecules move faster, require more room, and we say the substance expands.

If ice be heated the temperature rises till it gets to 0° C., at which temperature it remains till all the ice is converted into water. Heat still being applied, the temperature rises till boiling point is reached, then it will not get any hotter. To change 1 pound of ice at 0° C. to water at 0° C. requires as much heat as would raise the temperature of the water to 80° C., and to change 1 pound of water at 100° C. to steam at 100° C. requires as much heat as will raise 542 pounds of water 1°. What becomes of all this *latent heat*, as it is called? It is converted into motion. To make the slow-moving molecules of solid ice move as fast as those of liquid water requires work to be done on them; this is done by the heat. And again, to convert the motion of water into the much quicker motion of steam requires much work. This energy, however, is not lost, for on condensing steam the same amount of heat is given out, in other words, when a liquid is evaporated heat is absorbed and converted into molecular separation, and in condensing molecular separation is changed into heat.

You will have noticed that when a very soluble solid, as potassium iodide, is dissolved in water the solution becomes cold. This is due to the solid as it dissolves requiring heat to enable its molecules to move as quickly as those of the water; this heat it takes from the nearest substance, as the bottle and the hand, which therefore feel cold.

Freezing mixtures depend on the same principle; two solids are mixed and become liquid by the absorption of water, therefore abstract heat.

In the ether spray used in surgical operations the rapid evaporation of the ether requires much heat, and therefore the flesh is rendered very cold and insensible to pain.

If air is compressed work is done on it, and it becomes hot; if when this heat has escaped it be allowed to expand it does work, and becomes cold. This is how much of the Australian meat is frozen during the voyage.

Heat is changed into kinetic energy, or energy in motion in the winds. This radiometer also produces the same change. It consists of four vanes, black on one side and bright on the other, placed in a vacuum. When exposed to a strong light the vanes rapidly rotate. Trevelyan's rocking bar is another example of the same change. It consists of a heated brass prism with a groove underneath placed on a bar of lead; the heat makes the lead expand and throws the rocker into rapid vibrations, causing the musical note you hear.

A very important application of this change is the steam engine, which changes heat into work or kinetic energy, the intermediate stage in the change being the molecular separation of the steam.

Heat is also converted into electricity. During evaporation this is always the case. In this way the sun's heat is converted into electricity, which is displayed in lightning. The particles of aqueous vapour caused by the evaporation at the surface of the ocean are electrified; when these particles unite to form a cloud their electricity is accumulated in it; when this is discharged thunder and lightning are produced.

When crystallization occurs electricity is produced; this may be observed by dissolving arsenic in hydrochloric acid and allowing it to crystallize in the dark; as each crystal forms a flash of light is produced.

The thermopile is a very delicate indicator of heat; it consists of a series of V's, one side of each being bismuth, the other antimony, soldered together at the top and bottom. If now the lower junctions be heated and the upper ones kept cool a current of electricity is produced, shown by the deflection of the spot of light of a galvanometer. Here also is heat changed into electricity.

Electrical energy undergoes many changes; it becomes light in the aurora borealis, lightning, and the electric light. In the arc electric light the current passing between two carbon poles burns the particles at a white heat. In incandescent lamps the carbon thread is kept white hot by the electric current, but being in a vacuum is not burnt.

In electrolysis a current of electricity effects chemical separation. Here I have the decomposition of water into oxygen and hydrogen by a Grove's battery. I will now remove the battery and replace it by an electric bell, which, when connection is made with the decomposed gases, rings. In the first case the electric current becomes changed into chemical decomposition of the water, in the second the chemical combination of the gases produces a current and rings the bell.

This experiment illustrates the changes of energy which take place in electrical accumulators or secondary batteries. These as made by Elwell-Parker consist of leaden plates, perforated with square holes into which red lead is pressed, placed side by side in dilute sulphuric acid, alternate plates being connected by wires. When an electric current is passed into the battery chemical changes occur, resulting in the red lead (Pb_3O_4) on the negative plate being oxidized to peroxide of lead (PbO_2), that on the positive plate being reduced to metallic lead. If the positive and negative poles are connected by a wire, the chemical change becomes reversed, both plates become covered with sulphate ($PbSO_4$) and a current is produced. These accumulators have recently had a successful trial for driving tram cars in this city.

In the medical magneto-electric machines the electric current is produced by a U of soft iron surrounded by coils of wire being rotated rapidly before a steel magnet. In the large dynamos used for electric lighting, the essential difference is that an electro-magnet is used instead of a permanent steel one. Here kinetic energy becomes electrical energy. But if we pass a current into a dynamo the reverse takes place, motion appears, and we call it an electro-motor. I have here a dynamo and an electro-motor connected by wires. As I turn the handle of the dynamo the electro-motor also turns.

Kinetic energy is always becoming heat by friction and percussion, as in moulding pills. If a cold button is rubbed it becomes hot, the only source of which could be the work I did in rubbing it.

When a cannon ball hits a target it frequently becomes red hot, the energy of the mass in passing through the air becomes energy of the molecules or heat.

Kinetic energy of friction becomes electrical energy in the electric machine, essentially a revolving glass surface coming in contact with rubbers. Sand at the top of the great pyramid is found to be electrified, due to its friction with the air.

The energy that is due to position is called potential energy. If a stone be thrown up into the air, the kinetic energy imparted to it by the hand has disappeared on its reaching its highest point, but if the stone be then caught, it possesses energy of position, which again appears as kinetic if the stone be allowed to fall. A swinging pendulum is a good example of the same changes, at the middle of the stroke the energy is all kinetic, at the ends all potential, at intermediate positions partly kinetic and partly potential.

A remarkable display of energy takes place in plants. They take in carbonic anhydride (CO_2), and by the aid of the sun's light decompose it, retaining the carbon and giving out the oxygen. To do this a large amount of energy is necessary. In the carboniferous period this was done on a very large scale by the forests, and the coal we now burn has been produced from carbonic anhydride by the energy of the sun's light and vegetation. This explains Stephenson saying he worked his steam engines with bottled sunbeams.

Plants also transform much solar energy in causing this carbon to unite with the elements of water forming starch. The elements of starch, combined with nitrogen, from ammonia or nitrates, form albumenoid, as gluten. Thus the plant, out of the simple substances, water, carbonic anhydride and ammonia, forms the highly complex bodies starch, gluten, sugar, alkaloids, oils, etc.

The work expended upon the plants by the sun is changed into heat and work when the plants are eaten by animals; the complex vegetable products, modified and passed into the blood, meeting with the oxygen carried from the lungs by the red blood corpuscles becomes oxidized, setting free energy. About one-sixth of this may be expended in external work, the rest is used in heating the body and doing its involuntary work, as the movement of the lungs and the beating of the heart.

Why do we feel hot when we take violent exercise? The reason is chemical combination takes place much more rapidly. This may be roughly measured by the increase in the quantity of air consumed, for in walking four miles an hour, five times as much air is required as when lying down, walking six miles an hour requires seven times, swimming four times, and the treadmill five and a half times as much air.

During these exercises the temperature of the body, as measured by a thermometer, does not increase, for the heat is changed into molecular separation by the evaporation of the perspiration. In fact, the heat is used up in making the molecules of the water move faster and become steam.

Animal energy becomes electricity whenever a muscle is contracted. This may be the cause of the shocks of electric eels; also, if a ray of light falls on the retina of the eye an electric current is set up in the optic nerve.

To trace the changes energy undergoes is a very interesting and instructive task, but I have only time to show three experiments illustrating it. In Dvorak's sound mill a tuning fork is sounded before a brass resonator, and the puffs of air expelled from the hole in the opposite side of it turn the vanes of a small windmill. Here the kinetic energy of the fork becomes sound, which is again changed into the motion of the vanes.

As I turn the handle of this dynamo you see the electric lamp glows. My muscular energy is converted successively into motion, electricity, light, and heat.

In the electric bell chemical combination in the battery becomes electricity, this carried by the coils of wire round a piece of soft iron makes it a magnet, this magnet attracts a piece of iron which strikes the bell, but in doing so breaks the circuit, the iron ceases to be a magnet, the hammer flies back by the force of a spring, and the whole process is rapidly repeated. Here energy becomes successively chemical combination, electricity, magnetism, motion and sound, which eventually becomes heat.

The term conservation of energy is a grand generalization from many experiments; it is of equal value with the similar doctrine of the indestructibility of matter. It states that energy can neither be produced or destroyed, but only changed in form, and if we could exclude external forces the total quantity of energy in the earth would always be the same however the amounts of individual forces might vary.

A word must be said in passing of an experiment of Dr. Joule, of Manchester. He allowed a falling weight to turn a paddle in a box containing water and measured the amount of heat produced in the water by the friction. The relation of the kinetic energy of the falling weight and the amount of heat produced was perfectly definite, 772 pounds falling 1 foot being sufficient to raise the temperature of 1 pound of water 1° F. This relation is known as the mechanical equivalent of heat.

In all the changes of energy heat is produced which cannot be utilized, as in the wires of the battery, friction, etc. We can change work into heat, but all the heat cannot be changed back into work. Eventually all the forms of energy will become heat at a low temperature, which is useless for work. "Universally diffused heat is what we may call the great waste heap of the universe, and this is growing larger every year." This is the doctrine known as the dissipation of energy; the energy is not lost, but becomes useless to us, as a bar of iron is more useful for work than an equal weight of iron filings.

Let us now sum up the natural stores of energy at present in the earth and trace them to their source. Fuel, both wood and coal, and food I have already traced to the sun's light and heat. The energy of wind is due to the same cause, as also that due to a head of water, for the sun, by evaporating water at the level of the sea, gives it potential energy which becomes kinetic in the falling stream from the mountains. Tidal energy is due to the earth's rotation; in fact the mass of the oceans attracted by the moon acts as a huge brake on the earth's rotation, and will eventually stop it. By means of water wheels and a dynamo these latter sources of energy may be made to produce an electric current, 50 per cent. of which may be utilized as work by an electro motor; this may be useful when our supplies of fuel are used. Another insignificant source of energy is present in the chemical separation implied in native sulphur, iron, etc.

A short description of the sun will be of interest to us, as he is the source of all our stores of readily-available energy.

The sun has an intensely hot liquid interior, the circumference of which is larger than the moon's orbit round the earth. Next is the photosphere, three or four hundred miles deep, containing zinc, iron and copper in a state of vapour. There is a rose-coloured stratum, the chromosphere, containing much hydrogen, six to ten thousand miles deep, and occasionally

rising in prominences of two hundred thousand miles. Around this is the corona, probably one million miles. The mean temperature of the sun is estimated at 14,000° C., and every square foot gives off energy equal to seven thousand horse power, or to put it differently, if we could build up a solid column of ice 2½ miles in diameter from here to the sun, ninety-three million miles high, and concentrate the sun's heat on to it, in one second it would be melted, and in seven more converted into steam.

How is this enormous amount of heat obtained by the sun? Combustion is wholly inadequate; for every thirty-six hours a mass of coal equal in size to the earth would be required.

A theory proposed by the late Sir W. Siemen's has now, I believe, merely historical interest. He argues as follows:—The sun turns on its own axis once in twenty-five days, and because of his great diameter the motion of the surface at his equator would be one and a quarter miles per second, and gases there would be whirled off into space. These gases are assumed to be carbonic anhydride and oxide, nitrogen, hydrogen and marsh gas. This is supported by the fact that meteorites which have been examined have been found to have occluded these gases. When they get into space, the heat of the sun, only one part in two hundred and twenty seven millions being stopped by the planets, dissociates them; that is, decomposes carbonic anhydride into carbon and oxygen, marsh gas into carbon and hydrogen, etc. When the dissociated gases have completed their cycles they return to the sun at his poles, where they combine, producing heat, and thus carrying back to the sun in some measure the energy that would otherwise be wasted.

Another theory is that the sun is continually attracting a shower of meteorites, whose motion becomes heat when they reach the sun. If the earth fell to the sun in this way the heat produced would be equal to the combustion of fifty-six thousand earths. The objection to this theory is that every year meteorites equal in mass to the moon would be required, and the resulting increase of solar attraction would soon seriously affect the orbits of the planets. As the motions of the planets are not changing this cannot be the sole source of the sun's heat, though it may supply a small contribution to it.

The third and most probable theory is that the sun is shrinking in size, and every pair of particles in the sun are gradually drawing nearer each other and giving up their potential energy as heat. If the sun contracted four miles in a century sufficient heat would be produced to do his work, and at this rate, he may continue a heat-giving body forty million years longer.

Looking backward there must have been a time when the sun was much larger than he is now, so large that he filled up all the space surrounded by the orbit of Mercury, earlier still he must have reached to the earth's orbit, and at a much earlier period to that occupied by the path of his farthest planet Neptune, and, if occupying all this space, the density would be so small that many billion cubic miles of it would scarcely weigh a gram.

The nebular hypothesis states that if it be granted that our solar system was originally a uniform ball of nebulous matter with a slow rotation, and that every particle had attraction for every other particle, known laws would be sufficient to produce from this our varied planetary system.

This mass, under the reciprocal attraction of its parts, would gradually condense, producing heat and increasing the velocity of rotation, the increased rotation would change the ball into a flat disc. At times the centrifugal force of the edge would be greater than the attraction and a ring would be thrown off. If this cooled uniformly a number of planets would be formed, as the asteroids, between the orbits of Mars and Jupiter, if it did not cool uniformly a ball or planet would be produced. These nebulous masses would contract in the same way, the rings forming moons or (in Saturn) remaining as a ring.

The evidence in favour of this wonderful speculation is all indirect. It accounts for these very remarkable facts. All the great planets and two hundred small ones revolve the same way round the sun, and rotate on their axes in the same direction. The moons, except those of Mars, revolve in the same direction round the planets, and as far as has been observed rotate in the same manner. All great and many small planets have orbits in the same plane and nearly circular in form.

The examination of nebulæ also supports this theory, some are uniform luminous patches, others have one or more nuclei visible. Herschel has arranged them in a series ranging from faint nebulous patches to ordinary stars; they are considered to be solar systems in different stages of formation.

The nebular hypothesis cannot be proved; the verdict of science with regard to it is thus given by Newcomb:—"At the present time we can only say that the nebular hypothesis is indicated by the general tendencies of the laws of nature, that it has not been proved to be inconsistent with any fact, that it is almost a necessary consequence of the only theory by which we can account for the origin and conservation of the sun's heat, but it rests on the assumption that this conservation is to be explained by the laws of nature as we now see them. Should anyone be sceptical as to the sufficiency of these laws to account for the present state of things, science can furnish no evidence strong enough to overthrow his doubts, until the sun shall be found growing smaller by actual measurement, or the nebulæ be actually seen to condense into stars and systems."

Mr. Perry opened the discussion with a few congratulatory remarks, and called on—

Mr. Robinson, who said that on receiving the notice he was surprised that anyone was bold enough to attack so large a subject in one paper. Time did not permit of detailed discussion, but he was sorry that a pet subject of his—electricity—had not received more attention and experiments. He also alluded to the probable extended use of electricity when our coal supplies should fail, and concluded by proposing a vote of thanks to Mr. Liverseege.

Mr. Jones, in seconding the vote of thanks, said that as the subject was by no means exhausted he would be pleased if Messrs. Robinson and Liverseege would give similar papers in the next session.

Mr. Alcock said he congratulated the author on the success of his experiments, which in every case were very successful, and this was not always the case in lectures of this kind. He hoped that they might have a future paper of the same kind during the coming session.

Mr. Campbell pointed out recent surgical uses for the electric light.

Mr. Liverseege, in replying, said his paper at first contained much more relating to electricity, but he had omitted it as it only indirectly related to the changes of energy. He said he thought anyone showing experiments should have sufficient confidence in the laws of nature to depend on them without using undue means to make the experiments successful. He proposed—"That the best thanks of the Association be given to Dr. Poynting and Mr. Russell for their kindness in lending apparatus."

Mr. Perry, in seconding the vote of thanks, spoke of the uniform kindness of the Mason College authorities.

The attendance was good.

Proceedings of Societies in London.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, March 28, Mr. W. L. Williams, Vice-President, in the chair.

A paper on "Lactic Acid" was read by Mr. C. J. Wain, who described the different isomeric varieties of this acid, and gave details of their constitution, graphic formulæ, modes of synthesis, and products of decomposition. The method of preparing ordinary lactic acid (inactive ethidene lactic acid $CH_3CHOHCOOH$) was described, and the Pharmacopœia tests of purity and strength referred to. The author had intended examining a number of commercial specimens to ascertain if they met the requirements of the Pharmacopœia, but was prevented by pressure of other work from doing more than two specimens, one of which contained 73 per cent. of acid and was free from impurities, while the other contained 71·9 per cent. of acid and contained some sugar and calcium salt.

A discussion followed, in which the Chairman, Messrs. Salter, Ough and Short took part.

Mr. E. J. Eastes then gave a—

Report on Physics.

BY ERNEST J. EASTES, A.I.C.

The following is an abstract of the principal subjects noted:—

An apparatus for boiling with a reflux condenser, J. W. Leather, Ph.D.* The new arrangement enabling the process to be changed at will to one of distillation without altering the position of the condenser.

An apparatus for fractional distillation in a vacuum, by J. W. Bruhl.† This consists of a cylindrical vessel closed at the bottom, and having a tubulure for connection with a pump. The top is provided with a ground flange and covered with a lid ground to fit. In the lid are two tubulures. One, in the centre, is closed by an indiarubber stopper. Through this passes a rod by means of which a circular rack containing test tubes can be rotated so as to bring the tubes successively immediately beneath the exit of the condenser tube, which passes air-tight through the other tubulure.

The amphisbæna; a new barometer, by T. H. Blakesley‡. A straight glass tube, closed at one end and open at the other, having a uniform internal cross section of 1·2 mm. or ·05 inch. A thread of quicksilver occupies a portion of the tube, the space between it and the closed end being filled with air. A uniformly graduated scale whose zero coincides with the closed end is attached, by means of which the volume of the confined air can be determined. The instrument can be suspended vertically with the closed end either upwards or downwards. To take an observation the volume of the contained air is noted in each position, the sum of the two readings divided by their difference and multiplied by the length of the quicksilver thread.

An extremely sensitive electroscope lately described by C. V. Boys at the Ashmolean, Oxford, consists of two soap bubbles supported on metal rings close to each other but not in contact. On bringing an electrified body into their immediate vicinity the two bubbles immediately coalesce and form one. The same gentleman also explained and illustrated by means of soap bubbles the change in configuration before and during its breaking down, of a column of liquid projected vertically upwards.

Recent experiments by A. Righi,§ with the spark of a large battery, having a capacity of 18,810 electro static units, illustrate on a large scale the effects of atmospheric electricity. A loud and large spark, 5 metres or longer, was obtained on a flat strip of glass coated with zinc filings. If in the circuit is placed a platinum wire 3½ metres long and ·05 mm. in diameter, the discharge instantly fuses and changes it into a beautiful corona of incandescent globules. Similar effects are obtained by using wires of various other metals. If the platinum wire employed have a length of about 1½ metres only, at the moment of discharge there is a white spark, occupying the position and following the outline of the wire, accompanied by a little smoke having a peculiar penetrating odour. Wires of other metals give more smoke but no odour. The author's explanation is that the first portion of the discharge converts the wire into a state of vapour, the remainder then finds a column of metallic vapour at a high temperature offering an easy path. Instantly a kind of Geissler tube is formed, its sides being the surrounding cold air full of gas, rarefied because of the high temperature. He proves his explanation experimentally.

A hydrostatic balance, by J. Joly,* consists of a hollow sphere, floating in another hollow sphere filled with water, and suspended from a hook. To the base of the inner sphere is attached a fine wire, passing vertically through a narrow tubulure in the outer sphere, and supporting a pan which carries the weights and the substances to be weighed. The method of weighing is that of substitution. Very considerable delicacy is claimed for the instrument. Various ingenious contrivances increasing its accuracy, sensitiveness and permanency are described and illustrated in detail in the original paper.

The report, which was graphically illustrated with sketches and experiments, gave rise to a discussion, in which the Chairman, Messrs. Ough, R. H. Bremridge and Short took part, after which the meeting adjourned.

* *Journ. Soc. Chem. Ind.*, February 28, 1889, p. 81.
† *Berichte*, vol. xxi., p. 3339.
‡ *Philosophical Mag.*, Nov., 1888, p. 458.
§ *Phil. Mag.*, March, 1889, p. 285.

Obituary.

WARREN DE LA RUE, D.C.L., F.R.S.

The death is announced on Friday, the 19th inst., of Mr. Warren de la Rue, at the age of seventy-four. A native of Guernsey, he was educated in Paris, and succeeded his father as head of the firm of Thomas de la Rue and Co., from which he retired in 1880. His earlier contributions to science were chiefly papers on voltaic electricity and the deposition of metals. Subsequently he published a memoir on cochineal, and, in conjunction with his friend, Dr. Hugo Müller, another on the constituents of rhubarb, among which they were the first to observe chrysophanic acid. But his name is most associated with the application of photography to the recording of celestial phenomena, on which subject he produced a large number of papers. In connection with Dr. Müller also he carried on a series of investigations upon the electrical discharge, using a battery of 15,000 chloride of silver cells, the results of which were given in a collected form in a lecture at the Royal Institution in 1881. Amongst the many honorary posts filled by Mr. de la Rue may be mentioned those as honorary secretary and afterwards president of the Astronomical Society, president of the Chemical Society for two separate periods, president of the London Institution and secretary of the Royal Institution. In addition, he was a member of numerous foreign learned societies.

Notice has also been received of the death of the following:—

* *Phil. Mag.*, Sept., 1888, p. 266.

On the 14th of April, Mr. Henry Albert Purnell, Chemist and Druggist, High Street, Cheltenham. Aged 46 years.

On the 15th of April, Mr. Thomas New, Chemist and Druggist, Evesham, Worcestershire. Aged 72 years.

On the 18th of April, Mr. Robert Palmer, Chemist and Druggist, Ovington Square, London. Aged 75 years. Mr. Palmer, who had retired from business for some years past, was one of the Founders of the Pharmaceutical Society, and in 1856 was elected a member of the Council.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Eve of the Election.

Sir,—Allow me to express some little disappointment that although we have had a list of seventeen candidates submitted to us for selection for the coming Council, we can as yet form no idea as to their opinions upon our trade difficulties, unless we have the honour of a personal acquaintance. I should like to ask, what is the principle or principles which guide members of the Society in making their selections from year to year? Is it geographical, and the endeavour is therefore that imaginary centres throughout the kingdom shall be represented? Or is it a member of some historic house, or the maker of some speciality, in London or the country, who is selected?

Imagine candidates for Parliamentary honours expressing no opinion publicly upon Irish Home Rule, Mr. W. O'Brien and his woes, and a multitude of other matters. How soon interest in politics would die out.

What kind of a Commons House of Parliament would we have if we ignored the questions of the day, and voted for our M.P's. for a thousand and one reasons except the right one? What apathy akin to despair would gradually stiffen the pulses of active political life!

The indifference shown by members, in the non-return of a large percentage of ballot papers, is to be attributed to this blind voting, to these vague and indefinite reasons or fancies, yet they are all we have available to influence our selection, and the consequent result is, that there is hardly a meeting of the trade held in any of our provincial towns when the Society is mentioned, but it is greeted with derision. This should not be. It is time a more wholesome condition of things should arise. It is of vital importance the Council is in touch with the members of the Society, and the initiative should be taken by the candidates making a declaration of opinions upon questions which I need not particularize, but which are of great importance to the trade.

It is not only for the purpose of advancing chemistry and pharmacy, promoting a uniform system of education, administering the Benevolent Fund, but also for the protection of our *trade interests*, that we confide into the hands of the Council the powers and influence conferred by Royal Charter. R. Hayton Davis.

Sir,—The letters which have been published in the Journal during the last few weeks, bearing the signatures of Mr. Proctor, Mr. R. H. Davis and others, touched upon several points of very real importance in the interests of their fellow pharmacists. In common with many others, I feel that the official response which has been thus far forthcoming has not been adequate to the occasion, and I fear it will only tend to increase the already widespread conviction that the Council of the Pharmaceutical Society is out of harmony with by far the larger portion of the body, whose interests it alone has the legal power to watch over and guard.

It is natural that men whose incomes are for the most part small and hardly earned should ask themselves what return they get for the annual subscription of one guinea. And when they read of large sums being spent in "researches" of very doubtful utility (pharmaceutically considered) and upon elaborate enlargements of the central establishment in London, and yet see so little being attempted in the way of protecting the few "rights" which a grudging legislature has given in return for substantial demands made, it is no wonder that the question often arises, "In what manner can the Council of the Pharmaceutical Society be so reconstituted as to bring it into active sympathy with the felt needs of those whom it should represent?"

All governing bodies, whether political, ecclesiastical, commercial, social or educational, require from time to time to be revised and adapted to altered surrounding circumstances. It appears to me that we have reached one of these periods in the history of the Pharmaceutical Society, and that it is a matter of urgent and pressing importance to find a few wise and firm councillors able and willing to rescue the Society from its present unenviable position.

Whilst the few "rights" bestowed by the State are felt to be slipping away, and the public, demoralized by store-dealing, are less and less willing to pay a fair price for skilled pharmaceutical labour, it is surely most unjust to the rising generation of chemists to endeavour to burden them with a compulsory curriculum. The present Minor qualification amply provides for the public safety, and it is certainly true that, in the business of a chemist and druggist as usually carried on, no wider foundation of technical skill or knowledge is called for or needed. Therefore let compulsion stop at the Minor examination, and beyond that create whatever honorary titles you like, to which those who have the power and the means at their disposal may aspire and attain.

In conclusion, I would earnestly appeal to more good and practical men, like Messrs. Proctor and Davis, to come forward and place themselves and their opinions in the forefront; and then next year we may, after due consideration, have the satisfaction of sending really representative men to the Council chamber.

Harrogate. Freshfield Reynolds.

The Research Laboratory and the Antivivisection Society.

Sir,—I quite agree that the Antivivisection Society should have had good grounds for supposing that the "promoting experiments with drugs on animals" formed any part of the object with which the Society's Research Laboratory was founded, but it is most monstrous to suppose that if it had been intended to carry on such diabolical work that there would be any "impudence" on the part of any body of Englishmen who should "attempt to interfere." I am glad to have the assurance of the President of the Pharmaceutical Society that there is no intention on the part of the Council to prostitute the Society's premises to any such purpose.

Dawlish. George John Cutliffe.

Pronunciation of Cascara Sagrada.

Sir,—I wish to invite an expression of opinion on the pronunciation of cascara, in which the middle syllable, although almost universally made long, should according to those people who speak Spanish, be unaccented, and it is a pity to let such an easily corrected mistake be perpetuated. Servus.

*** [There can be little doubt that the correct pronunciation is cáscara sagráda.—Ed. P. J.]

B. S. Proctor.—The questions had better be addressed to the Commissioners of Inland Revenue, who possibly may furnish answers that will be considered authoritative by you.

J. F. Brown.—We fail to see that the settlement of the question will be advanced by the publication of your letter.

A. E. Beard.—The fresh plant is *Cardamine hirsuta*. The others are (1) *Filago germanica*. (2) *Psamma arenaria*. (3) *Triticum junceum*. (4) *Diplotaxis muralis*. (5) *Senebiera Coronopus*. (6) *Erigeron acris*. (7) *Bidens cernua*. (8) *Senecio Jacobæa*.

A. J. Mason.—(1) Gas coke carbon, or carbon similarly prepared. (2) No.

Communications, Letters, etc., have been received from Messrs. Strother, Allen, Leonard, Assistant, Minor, F.J.B.

ANNUAL REPORT OF THE COUNCIL,

To be presented at the Forty-eighth Annual General Meeting of the Pharmaceutical Society of Great Britain.

In presenting the Forty-eighth Annual Report the Council has to record that the financial statement shows a slight excess of expenditure over income. This, however, is not due to normal outlay, but to the incidence of several charges for furnishing and fitting the new building, that have been charged to the Current Account and not to the Capital Account, to which the cost of the building itself has been debited.

There has been a decrease of nearly £100 in the gross receipts from subscriptions, but the amount received from candidates for examination shows an increase of nearly £200 as compared with the previous year.

The number of candidates in 1888 for the Minor examination was 9 in excess of that of the previous year. The Preliminary examination showed an increase of 20, whilst the number of persons presenting themselves for the Modified examination was the same as in 1887. The most gratifying fact in connection with the examinations is the increase of 23 in the number of candidates for the Major examination, 117 having presented themselves in 1888 and 94 in 1887.

Dr. Thomas Stevenson, official Analyst to the Home Office and Lecturer on Toxicological Chemistry and Forensic Medicine at Guy's Hospital, has been appointed Visitor to the examinations on behalf of the Privy Council, in succession to the late Dr. Greenhow.

The amount received on account of the Journal for advertisements and sales has been almost sufficient to cover the cost of its production and supply to the subscribers of the Society, and also its gratuitous distribution to a large number of British and Foreign Societies and Associations.

Upwards of three hundred books and pamphlets have been added to the Library in London during the year, and numerous additions have also been made to the Library in Edinburgh. In the case of both Libraries the Council has to thank various donors for valuable contributions. A revised Catalogue was issued in January last.

A large number of important donations to the Museum has been made during the past year. The Director of Kew Gardens presented 300 specimens, and a series of rare chemicals were received from the "Fabbrica Lombarda di Produtti Chimici" at Milan. A series of Indian medicinal plants and many rare and curious drugs have been received; also a number of excellent microscopic slides of drugs, besides other objects of interest from firms and individuals at home and abroad.

In October last the forty-seventh session of the Society's School of Pharmacy was inaugurated by an address delivered to a large and appreciative audience by Sir Henry Roscoe, M.P., F.R.S., an Honorary Member of the Society. Sir Henry Roscoe has also rendered the Society great service by the active part he has taken in the introduction and promotion in the House of Commons of the Pharmacy Acts Amendment Bill. At the close of the Inaugural Meeting a testimonial was presented to Emeritus-Professor Bentley in token of the esteem and respect in which he is held by his old pupils and friends. A portrait of the Professor was also presented to the Society by the subscribers to the testimonial.

The Council had under its consideration in August an alteration in the course of instruction in the Society's School. It has not been found possible to compress within a period of five months a complete course of instruction in all the respective subjects and to repeat this course during the session. A plan, very similar to that which was originally adopted in the School, has therefore been reverted to, and the course of instruction, which formerly occupied five months, now extends over the entire session, being divided for the convenience of students into an elementary and an advanced portion.

The Evening Meetings of the Society both in London and Edinburgh have been characterized by more than ordinary interest. A number of useful papers have been read during the year, and the results of several investigations conducted in the Pharmaceutical Society's Research Laboratory have been communicated to the meetings held in London.

A resolution was passed by the Council in October to the effect that carbolic acid ought to be deemed a poison within the meaning of the Pharmacy Act, 1868. This resolution was communicated to the Privy Council, together with a letter reminding their Lordships of a similar resolution submitted to them by your Council in 1881 for approval, and on which no decision had been arrived at. To these resolutions the Government Department has not yet given its confirmation.

The Research Committee appointed by the Council as mentioned in the report of last year has had the laboratories, etc., in the new building fitted up for research work. The Professor of Chemistry having been appointed Director of the Laboratory, and Mr. Dymond, Demonstrator, several important investigations have been made, and the results published in the Journal. The work initiated in the Society's Laboratory has been supplemented by experiments conducted by Professors Cash and Leech and Dr. Lauder Brunton. The Committee, in accordance with the terms on which it was appointed, has received the co-operation as additional members, of Professor Michael Foster, F.R.S., Professor Frankland, F.R.S., Dr. Lauder Brunton, F.R.S. and Mr. Charles Ekin. The result of the work done fully detailed in the report submitted to the Council in March last has been the

Receipts. GENERAL FUND—FINANCIAL

	£ s. d.	£ s. d.
Balance January 1st, 1888:—In Treasurer's hands	1299 9 6	
In Secretary's hands	114 5 7	
In Honorary Treasurer's hands (Scotland)	57 18 2	
		1471 13 3
Life Members' Fund:—Interest	87 11 3	
Life Subscriptions	42 0 0	
		129 11 3
Interest on Investments		490 0 3
Subscriptions:—1473 Members, Pharmaceutical Chemists	1546 13 0	
641 ,, Chemists and Druggists	673 1 0	
1281 Associates in Business	1345 1 0	
941 Associates not in Business	494 0 6	
1023 Apprentices or Students	537 1 6	
8 Entrance Fees	16 16 0	
	4612 13 0	
Fees paid upon restoration to the Society	18 7 6	
		4631 0 6
Examination Fees:—1520 Preliminary Examination	2739 16 0	
4 Modified ,,	4 4 0	
1145 Minor ,,	3086 17 0	
121 Major ,,	514 12 0	
		6345 9 0
Registration Fees:—10 Fees for Restoration to the Register	10 10 0	
8 Registration Fees as Chemists and Druggists	42 0 0	
		52 10 0
Journal:—Advertisements	4436 7 7	
Sales	357 9 8	
		4793 17 3
Register:—Sales to the Government	147 10 0	
Sundry Sales	12 5 0	
		159 15 0
Calendar:—Sundry Sales		25 17 0
Penalties and Costs for infringements of the Pharmacy Act		158 9 7
Rent of Stable in rear of 36, York Place, Edinburgh		18 17 1
Sale of £4500 New Three per Cents		4499 7 0
		£22,776 7 2

STATEMENT FOR 1888.

Expenditure.

			£ s. d.		£ s. d.		£ s. d.
Annuities:—Professor Redwood							100 0 0
Mr. Elias Bremridge							400 0 0
Carriage of Books, and other Parcels							25 10 9
Certificates of Death							20 10 10
Conversazione			96 13 3				
Evening and other Meetings			55 3 8				
							151 16 11
Examiners, Boards of—	*England and Wales.*		*Scotland.*				
Fees to Examiners	1669 10 0		434 14 0				
Fees to Superintendents—Preliminary Examination	207 18 0		33 1 6				
Hire of rooms for conducting Preliminary Examination	67 16 10		6 18 0				
Travelling Expenses	243 13 6		35 15 10				
Refreshments for Examiners	92 17 11		20 3 10				
Apparatus, Drugs, and Chemicals for Examinations and sundry charges in connection therewith	260 19 5		54 16 9				
	2542 15 8		585 9 11				
(*England and Wales*)	2542 15 8						
			3128 5 7				
Fees to the College of Preceptors			181 7 0				
							3309 12 7
Fixtures and Fittings							8 13 3
Furniture (including Furniture for New Building)							176 12 8
Grant in aid of provincial education (Sheffield)							50 0 0
House Expenses:—Gas, Water, Coal, Cleaning Materials, etc.							334 19 4
Journal:—Editor and Sub-Editor's Salaries			750 0 0				
Paper			872 9 6				
Printing			2172 12 5				
Publishers' Commission			551 17 7				
Contributions and Engraving			332 10 6				
Reporting			77 0 0				
Attending Conference and other Meetings			31 10 0				
Parliamentary Papers and Sundry Charges			35 14 5				
							4823 14 5
Lectures:—Emeritus Professor of Chemistry and Pharmacy							100 0 0
Emeritus Professor of Botany and Materia Medica							100 0 0
Professor of Botany—Endowment of Chair			150 0 0				
Professor of Chemistry—Endowment of Chair			150 0 0				
Teacher of Practical Pharmacy			50 0 0				
Subscription to Royal Botanic Gardens			21 0 0				
Lecturers' Attendants			61 11 6				
Laboratory:—Professor of Practical Chemistry—Endowment of Chair			150 0 0				
			582 11 6				
Apparatus, Chemicals, Diagrams and Specimens for Lecture Classes, Prize Medals, Certificates, etc.			154 7 9				
Printing and posting prospectuses			63 7 11				
							800 7 2
Law Costs							471 3 8
Library:—Librarian's Salary			240 0 0				
Purchase and Binding of Books			121 4 8				
Library Association Meeting			10 10 0				
Catalogue			120 2 5				
							491 17 1
Museum:—Curator's Salary			350 0 0				
Assistant's Wages			61 3 0				
Specimens, Bottles and Sundries			123 9 9				
							534 12 9
Expenses in Scotland:—Assistant Secretary—Salary			150 0 0				
Taxes			32 12 10				
Travelling Expenses—Executive Committee			17 17 8				
Cleaning, Service and Miscellaneous Expenses			140 18 4				
							341 8 10
Postage:—General			235 0 0				
Journal (Cost of transmission to Members, Associates and Apprentices)			722 4 0				
							957 4 0
Register, Printing and Publication							161 3 2
Repairs and Alterations							443 9 5
Rent, Taxes, Fire Insurance, and Insurance of Plate Glass			541 9 5				
Ground Rent of new premises (Galen Place) six months to Lady Day, 1888			28 5 0				
							569 14 5
Returned Subscriptions to Associates							19 8 6
Stationery, Engraving, Printing, and Office Expenses			312 0 0				
Calendar—Printing and Publication			111 10 10				
							423 10 10
Salaries:—Secretary and Registrar			450 0 0				
Clerks and Servants			908 0 8				
							1358 0 8
Research Laboratory							207 10 0
Cost of Materials supplied to the Jacob Bell Scholars							10 0 0
Herbarium and Council Medals							5 5 0
Sundries							8 18 5
New Premises, Galen Place:—H. and E. Lea, Builders			3501 1 8				
Architects' Fees			200 0 0				
Surveyor's Fees			4 4 0				
Gratuity to Foreman			5 0 0				
S. Howlett—Dispensing Counters and Fittings			285 0 0				
Law Charges			30 3 0				
							4025 8 8
Travelling Expenses—Members of Council							421 14 8
Refreshments for Council							41 9 10
Balance, December 31st, 1888:—In Treasurer's hands			1728 3 11				
In Secretary's hands			118 2 4				
In Honorary Treasurer's hands (Scotland)			36 3 1				
							1882 9 4
							£22,776 7 2

BENEVOLENT FUND, 1888.

CURRENT ACCOUNT.

Receipts.	£	s.	d.
Balance in Treasurer's hands, Jan. 1st, 1888	11	9	1
Balance in Secretary's hands, Jan. 1st, 1888	9	3	5
Interest on Invested Capital and Ground Rents	876	17	8
Subscriptions	1500	3	6
	£2,397	**13**	**8**

Expenditure.	£	s.	d.	£	s.	d.
40 Annuitants at £35 per annum	1400	0	0			
9 Ditto at £30 ditto	270	0	0			
2 Ditto (deceased), 1 quarter at £35 per annum	17	10	0			
1 Ditto (deceased), 2 quarters at £35 per annum	17	10	0			
				1705	0	0
Casual Grants.						
Members of the Society and Registered Chemists and Druggists (12)	105	0	0			
Widows of ditto (29)	260	0	0			
An Orphan of a Registered Chemist and Druggist	10	0	0			
				375	0	0
Grant to the Secretary's Casual Fund				10	0	0
Payment from the Robbins' Fund—2 years, 1887 and 1888				10	0	0
Printing, Stationery and Postage				48	4	7
Balance in Treasurer's hands			**	248	10	3
Balance in Secretary's hands				0	18	10
				£2,397	**13**	**8**

CAPITAL ACCOUNT.

	£	s.	d.
Balance in Treasurer's hands, Jan. 1, 1888	725	8	0
Donations	182	0	0
Sale of £1800 2¾ per Cent. Consols	1786	9	6
	£2,693	**17**	**6**

	£	s.	d.	£	s.	d.
Purchase of £850 2¾ per Cent. Consols				847	12	6
Purchase of Ground Rents—Broomwood Park Estate	1721	1	0			
Surveyor's Charges	17	0	0			
Law Costs	35	8	6			
				1773	9	6
Balance in Treasurer's hands, Dec. 31, 1888				72	15	6
				£2,693	**17**	**6**

We, the undersigned Auditors, have examined the accounts of the Pharmaceutical Society of Great Britain, as presented in the Financial Statement and Benevolent Fund Accounts, and find them correct. We have inspected the Deeds relating to the House Property and Ground Rents named below, and also find that there was standing to the account of the Society at the Bank of England, and in the hands of the Society's Bankers, on the 31st December, 1888, the undermentioned Stocks, viz.:—

		£	s.	d.	£	s.	d.	
General Fund	New 3 per Cents.	4,500	0	0				
	New 2½ ,,	5,500	0	0				
	Freehold Ground Rents				10,000	0	0	
	Freehold Ground Rents at Paddington Green, London, W., cost.				5,551	5	6	
	House in Edinburgh, cost.				1,931	10	0	
	New Premises in Galen Place, cost.				10,031	4	8	
	New 3 per Cents (Life Members' Fund)				3,000	0	0	
							30,514	**0** **2**
Benevolent Fund	Consols				2,550	0	0	
	Freehold Ground Rents at Strawberry Hill, cost.				1,020	12	6	
	Freehold Ground Rents at Battersea, cost.				12,213	0	0	
	Freehold Ground Rents at Broomwood Park Estate, Wandsworth, cost.				7,454	7	10	
							23,238	**0** **4**
do. (Robbins Fund)	Gas Light and Coke Co. 4 % perpetual Debenture Stock.						**125**	**0** **0**
Secretary's Casual Relief Fund	Consols						**105**	**0** **0**
Pereira Memorial Fund	Consols						**100**	**0** **0**
Bell Memorial Fund	Consols						**2,050**	**0** **0**
Hanbury Memorial Fund	Consols						**400**	**0** **0**
Redwood Memorial Fund	Great Indian Peninsula Railway Stock						**400**	**0** **0**
Hills Prize Fund	Russian Bonds						**300**	**0** **0**

W. K. HOPKIN,
F. HARWOOD LESCHER,
S. LLOYD STACEY,
W. MANNING WATTS, *Auditors.*

March 22, 1889.

** **Note.—The whole of this balance was absorbed on January 9, 1889, in the quarterly payment of £443 15s. 0d. to the Annuitants.**

means of increasing the influence of the Society among those whose help and goodwill it is desirable to obtain.

During the current year 153 cases of infringement of the provisions of the Pharmacy Acts were reported and dealt with. In the majority of these cases the usual letter of warning from the Registrar was sufficient to prevent a repetition of the offence, and in those cases in which it was found necessary to institute legal proceedings no special feature arose to which attention need be drawn.

The Pharmacy Acts Amendment Bill, introduced into the House of Lords last session by the Earl of Milltown, was, owing to the state of public business, prevented from reaching a second reading in the House of Commons, and had consequently to be withdrawn in December. Your Council, deeming it to be its duty in the interests of pharmacy to make continued endeavours to amend the law relating to pharmaceutical education, has taken steps to reintroduce the same Bill as was last year submitted to Parliament. The present measure has been introduced into the House of Commons by Sir Henry Roscoe, Dr. Farquharson, Sir Tindal Robertson, Mr. Craig, Sir Trevor Lawrence and Sir Guyer Hunter.

The rates submitted to the Board of Trade by the various Railway Companies under the Act passed last session have been carefully considered by your Council. A memorial to be forwarded to the Board of Trade has been drafted, setting forth objections against the proposed rates, and especially calling attention to the injustice and incongruity of classification in regard to drugs and non-dangerous chemicals and pharmaceutical preparations. A copy of this memorial will also be sent to the leading railway companies.

The North British Branch continues to maintain its reputation for useful work, and the manner in which the Executive conducts the Society's business in Scotland is a source of satisfaction to the Council. The Museum and Library in Edinburgh are becoming more and more utilized and appreciated, whilst the papers read at the Evening Meetings have been the means of bringing many important subjects under the notice of pharmacists.

The houses, Nos. 15 and 16, Bloomsbury Square, having, under an agreement with the Duke of Bedford, come into the possession of the Society on March 25 last, your Council, after careful inquiry and consideration, has decided to rebuild two houses on the site, one, No. 15, to be let, and the other, No. 16, to be used for the purposes of the Society.

Your Council having considered it desirable that the Society should have district local representatives in London, a Divisional Secretary in each of the metropolitan boroughs—fifty-eight in all—was elected at its meeting in March. A conference of these officers was held shortly after their appointment, and it is confidently hoped that satisfactory results as regards the strength and prosperity of the Society, the interchange of information, and the support given to the Benevolent Fund will follow.

Notwithstanding the continuous endeavours of your Council to urge upon all registered persons the claims of the Benevolent Fund, it has not during the past year received more than the average amount of support from those for whose exclusive benefit it was founded. The amount subscribed in 1888 was £1500, whilst the amount for 1887 was £1470. The expenditure on account of annuities absorbed £1705, met in part by subscriptions, and in part by the income derived from investments, and a further sum of nearly £400 was expended in casual grants. Owing to the condition of the Fund it was considered necessary to limit the number of annuitants for election in December last to three, instead of electing six, as had been the annual practice since 1880. The Council again appeals to Local and Divisional Secretaries, members of the Society, and others to make renewed efforts to place the Fund in such a position that an increased number of annuitants may be elected, and larger grants made in deserving cases than is possible with the present restricted income.

During the year Mr. Baildon and Mr. Symes have retired from the Council. The vacancy caused by Mr. Baildon's retirement has been filled by the election of Mr. Watt, of Haddington, and Mr. Symes has been succeeded by Mr. John Harrison, of Sunderland. The retirement of Mr. Baildon caused a vacancy in the Executive and in the office of Chairman of the Executive of the North British Branch. Mr. W. Gilmour has been chosen to succeed Mr. Baildon in the latter office.

The Council has added the names of Professor Burdon Sanderson, M.D., F.R.S., LL.D., Waynflete Professor of Physiology in the University of Oxford, and Mr. William Crookes, F.R.S., a past President of the Chemical Society, to the roll of Honorary Members of the Society.

The obituary for 1888 is exceptionally long and includes many well known and much respected names connected with pharmacy. The death of Mr. John Williams, one of the Society's past Presidents, will be felt, not only by the Society of which he was for so many years a loyal and hearty supporter, but by all who practise Pharmacy in Great Britain. Mr. Williams, both as a member of the Society and of the British Pharmaceutical Conference, was personally so well known and beloved, that the Council feels that the members will regard his loss as that of a personal friend. Besides the official positions held by him in the Society, Mr. Williams had been President of the British Pharmaceutical Conference, and was at the time of his lamented death a Vice-President of the Society of Chemical Industry.

The Council has also to deplore the loss of Mr. Frederick Barron, an old member of the Society, and for many years an Auditor. Mr. F. Barron was a munificent supporter of the Benevolent Fund, and of all movements having for their object the advancement of pharmacy and the welfare of the drug trade.

The death of two of the Honorary Members of the Society has to be recorded. Dr. E. H. Greenhow, who for twenty years was the Government Visitor at the Society's examinations in London, and Sir W. O'Shaughnessy Brooke, an Honorary Member for more than thirty years.

Amongst the other losses the Society has sustained by death may be noted those of Mr. David Kemp, Mr. Richard Raimes, Mr. Francis Middleton, Mr. W. M. Colchester, Mr. Robert Palmer, and the following who had filled the office of Local Secretary :—Mr. H. R. Cornish, Mr. R. M. Davies, Mr. J. Hunter, Mr. T. White and Mr. J. D. Williams.

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The Pharmaceutical Journal.

SATURDAY, MAY 4, 1889.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE ANNUAL REPORT.

ALTHOUGH a number of communications have been received for insertion in this week's Journal, and notwithstanding the fact that they relate to subjects of immediate interest, the large amount of space occupied by the report of the proceedings at the Council meeting necessitates their postponement until the succeeding week. We therefore take this mode of asking our various correspondents to excuse the delay in publication, as being an unavoidable result of the precedence that must be awarded to reports of official transactions. Among the most important features of the Council meeting of last Wednesday were the Annual Report and the Financial Statement, both of which were then considered in committee, and ordered to be printed for issue to members and associates of the Society, together with the voting papers. In accordance with the custom that has now been adopted for some time both of these documents are published in this number of the Journal, and will be found at pages 881 and 882. From the report it will be seen that the ordinary work of the Society has been carried on during the past year with the same success as hitherto. In the School of Pharmacy there has been a reversion to the old plan of making the courses of instruction extend over the entire session, instead of attempting to compress them into a period of five months, and it will be seen from the reports of the Professors upon their classes, which came under the notice of the Council on Wednesday last, that the alteration is working satisfactorily. The evening meetings of the Society, both in London and Edinburgh, have been more than usually interesting and instructive. At the examinations the number of candidates has been generally in excess of those presenting themselves during the previous year, and in Edinburgh some important improvements have been made in the arrangements for carrying out the examination in practical dispensing, which are described as being very satisfactory in affording greater comfort to the candidates. One especially gratifying circumstance is the increase of the number of candidates for the position of pharmaceutical chemist. Of the other departments of the Society's establishments it appears that, both in London and in Edinburgh, the Libraries and Museums have been extended and enriched by purchases and contributions. The Council has also been active in the administration of the Pharmacy Acts; no less than 153 cases of infringement of their provisions having been reported and effectually dealt with. The support accorded to the Benevolent Fund has enabled the Council to continue the grant of annuities, but the amount subscribed for 1888 was insufficient to allow of the election of more than three annuitants last December, instead of six as in former years. In regard to the general finances of the Society there has been a slight excess of expenditure over income, arising from charges for furnishing and fitting the new addition to the premises in London, but in other respects there are no material alterations.

It is matter for regret that no decision has yet been arrived at in regard to the recommendation made to the Privy Council, eight years ago, that carbolic acid should be added to the poison schedule of the Pharmacy Act, 1868, and that the endeavours of the Council to carry out the intention of that Act in the interest of the public have not yet received confirmation by the Government. In like manner, the endeavour to establish a better system of education for pharmacists by means of the Pharmacy Acts Amendment Bill still remains unaccomplished, and notwithstanding the great need for a more powerful directing influence in that direction, as well as the favourable auspices under which the Bill has again been introduced into the House of Commons, it would perhaps be assuming too much to rely upon its yet obtaining a fair chance of consideration. Of other incidental work undertaken by the Council, reference may be made to the memorial that is to be forwarded to the Board of Trade on the subject of railway rates, and in connection with this subject attention may be directed to the report of the meeting of the Chamber of Commerce at page 897. The inauguration of a Research Laboratory is another important step that has been taken during the past year, and the possibility of appreciating fully its beneficial influence lies too much in the future to admit of further remark. But it may at least be said that this undertaking is one in accordance with the tendencies of modern enlightenment, and ought on that account to command support from members of the Society. Lastly, mention must be made of the organization of a staff of Divisional Secretaries in the metropolitan boroughs. These appointments, though originating mainly from the desire to obtain increased support for the Benevolent Fund may be looked to as affording opportunity for useful interchange of opinion and information, as well as local action in regard to various matters of interest from a trade point of view. There are several subjects that might well be dealt with on such a basis by the chemists in different localities, as a preliminary to their more comprehensive consideration by the Council if it should appear desirable.

To some of our readers it will be pleasant to be informed that on the 1st of this month fifty years had elapsed since Professor Heinrich Will, of Giessen, took his doctor's degree, and that many of his former students embraced the opportunity of offering him their congratulations and good wishes.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, May 1, 1889.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Messrs. Allen, Atkins, Butt, Cross, Evans, Gostling, Greenish, Hampson, Hills, Martin, Newsholme, Richardson, Robbins, Southall and Watt.

The minutes of the last meeting were read and confirmed.

The PRESIDENT said he had received a letter from Mr. Hopkin withdrawing his acceptance of the nomination as an auditor, and consequently it was necessary for the Council to nominate some one in his place. He begged to propose that Mr. Francis Yates, of 64, Park Street, Southwark, be nominated. He was an old student and member, and had long taken an active interest in the affairs of the Society.

Mr. ROBBINS seconded the nomination, which was unanimously agreed to.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following having passed the Major examination, and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Arden, Lawrence ....Thurlby.
Austin, William Hoskin .....Stoke, Devonport.
Bowden, Francis Henry.....Manchester.
Coats, John Thomson... .....Edinburgh.
Davies, Robert Higgins.....London.
Duckworth, Arthur .....Rochdale.
Gwillim, Walter Robert .....Abergavenny.
Hart, Frank .....Bolton.
Hogg, John Alexander .....Buxton.
James, William Montford.....Market Drayton.
Johnson, John Robert .....Cambridge.
Metcalfe, Arthur Pollard .....Hull.
Ogle, John Henry .....London.
Pater, Edward Rhodes .....Manchester.
Rudd, Henry Bulmer .....Bradford.
Tregellas, Clifton Pari .....London.
Whitfield, George .....Scarborough.
Woodruff, Thomas .....Stalybridge.

Chemist and Druggist.

The following, who was registered as being in business on his own account before August 1, 1868, having tendered his subscription for the current year, was elected a "Member" of the Society:—

MacCowan, Robert Thomas ...Paisley.

ASSOCIATES IN BUSINESS.

The following having passed their respective examinations, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Minor.

Adcock, Herbert Dickson .....Alcester.
Atherton, Henry Charles .....High Wycombe.
Atkinson, William George.....Ulverston.
Bascombe, William.....Streatham.
Batchelor, William .....Radcliffe.
Calvert, Albert Matheson .....Belper.
Charles, William Frederic.....Loughborough.
Deacon, Frederick George ...Southsea.
Donaldson, George.....Portsea.
Evans, Robert Daniel .....Birkenhead.
Hanson, Arthur .....Queensbury.
Henderson, Henry Alfred W...Ilkley.
Holliday, John.....Warwick.
Jeacock, Frederick Dawson ...Lowestoft.
Kelly, Philip Alfred .....Devonport.
Kidd, James Cassie.....Manchester.
Lawrence, Arthur Frederick...London.
Macpherson, William.....Dufftown.
Mitchell, John Albert .....Bradford.
Moore, James Temple .....Chiswick.
Morrell, Frederick .....London.
Morris, John .....Coventry.
Phillips, Benjamin.....London.
Plumbly, Walter.....Beccles.
Poole, Jeffrey .....Birmingham.
Scholey, John .....Burnham Market.
Sewell, Thos. Arthur WilliamsWest Norwood.
Sheffield, Arthur John .....Hull.
Smith, Edward Gibbs .....Merton.
Smith, Edwin Wells .....Sheffield.
Teebay, John .....Bolton.
Turnbull, William Scott ..... Hawick.
Watson, Albert James .....Debenham.
Weary, China Thomas .....Plymouth.
Woolnough, Harry Arnold.....Melbourne.

Modified.

Manning, Henry .....Fairford.

ASSOCIATES.

The following, having passed the Minor examination, and tendered (or paid as "Apprentices or Students") their subscriptions for the current year, were elected "Associates" of the Society:—

Anderson, Edward Ellice .....Portobello.
Aplin, John Dare .....Colyton.
Bates, John .....Manchester.
Beach, William Bertram .....Bridport.
Beauchamp, Fredc. Crawley...Hemel Hempstead.
Blenkiron, Jeremy .....Shildon.
Botterill, Fredk. William .....Otley.
Brown, John .....New Wingfield.
Burridge, Henry Alfred .....London.
Cameron, John.....Aberfeldy.
Churchyard, Oliver George ...Ipswich.
Cussons, John William .....Ossett.
Dennis, Fred Woodrow .....Louth.
Denny, John Harvey .....Woodbridge.
Eastwood, Frederick Allen ...Rochdale.
Evans, John Watkin Morgan..London.
Evans, Stephen William .....Sale.
Feather, Arad ....Pontefract.
Fuge, Harry Dixon.....Matlock Bath.
Fuller, George Sydney .....Thornton Heath.
Goode, Charles Edward Adams.Tunbridge Wells.
Goodwin, James .....Nuneaton.
Gough, Ernest William .....Clifton.
Haslop, George .....Oldham.
Hays, Frederick Arthur..... ..Birmingham.
Hurst, Richard Proudman.....Ramsbottom.
Jeffery, Arthur Harold .....Bridgnorth.
Jones, William Thomas.....Wellington.
Klosz, Sidney Albert .....London.
Knowles, Fredk. William .....Manchester.
Lakeman, Nicholas Frank.....Modbury.
Law, James .....Insch.
Lloyd, James Clement .....Lewes.
Longman, Samuel Hurman ...Wincanton.
Lothian, John .....Coldstream.
Mallinson, Fredk. William ...Spalding.
McDonald, George .....Glasgow.
McKay, James Alexander .....Dufftown.
Mackenzie, Stewart Murdoch..Musselburgh.
Martin, John .....St. Stythians.
Myers, Benjamin.....London.
Norman, Richard Henry .....Cottenham.
Proudman, Edward William...Leominster.

Reeve, Walter .....Norwich.
Roberts, Weston .....London.
Robertson, Robert .....Leith.
Sinclair, Neil Crawford.....Greenock.
Smith, Albert .....Royston.
Smith, William Murray.....Edinburgh.
Spurr, Herbert Edward.....Leeds.
Stedman, Arthur.....West Malling.
Stonham, Herbert Lovett .....Maidstone.
Stroud, Louis Lecomte .....Newport, Salop.
Taylor, Joe Harry .....Blackpool.
Thompson, Henry Clarence ...Belford.
Thornley, John Brooks .....London.
Tongue, Albert James .....London.
Wallace, William John .....Plympton.
Webber, Ernest Distin .....Tunbridge Wells.
Whitehead, John Henry .....Leeds.
Wilson, Wm. Mainland Lewis...Walthamstow.
Wolfendale, Richard .....Farnsworth.

APPRENTICES OR STUDENTS.

The following having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Adams, Arthur Edward.....Cleobury Mortimer.
Boucher, Charles Ernest .....Bristol.
Griffiths, William Robert .....Clynderwen.
Hare, Arthur .....Newcastle-on-Tyne.
Harries, Howell ....St. Clears.
Heale, Thomas Albert Oakley.Bury St. Edmunds.
Jenkin, James .....High Wycombe.
Johnston, John .....Forfar.
Knowles, Henry Percy .....Birstall.
Langley, John Inman.....London.
Morton, Lawrence Knyvett ...Kennington
Mountain, John Thomas .....Woodbridge
Pears, Harry William Kilby...Brighton.
Price, Walter William .....Worcester.
Robinson, Charles Edwin .....Nottingham.
Sant, Ernest.....Burslem.
Saunders, Edmund Thomas ...Newport Pagnell.
Sturton, Charles Hubert .....London.
Townsend, John Frederic.....Bristol.
Wooler, Frederic William.....Leeds.

Several persons were restored to their former position in the Society upon payment respectively of the current year's subscription and a fine.

RESTORATIONS TO THE REGISTER.

The names of the following persons, who have severally made the required declarations and paid a fine of one guinea, were restored to the Register of Chemists and Druggists:—

William Whately Russell Cooper, 18, Exmouth Street, Clerkenwell, London, W.C.
James Fleming, 1, Steel's Place, Edinburgh.
Hector Mackenzie, Burgh Road, Lerwick, N.B.

HONORARY MEMBERS.

The PRESIDENT said in accordance with the Bye-laws the names of—

William Crookes, F.R.S., past President of the Chemical Society, and
Professor Burdon Sanderson, M.D., F.R.S., Waynflete Professor of Physiology in the University of Oxford,

had been suspended in the library during the past month, having been selected by the Council at its last meeting, and he now begged to move the election of those gentlemen as honorary members. The number of honorary members was limited to fifty, and the election was the greatest honour which the Society as a corporate body could confer. He believed that not only the members of the Council, but all members of the Society who took an interest in science, would approve of the selection which had been made. Mr. Crookes was not only the discoverer of thallium and the author of an enormous number of original researches, but a man of undoubted genius and great originality. Dr. Burdon Sanderson, again, as a physiologist and biologist was probably as great a man as any living, and in electing these gentlemen as honorary members the Society was really conferring an honour on itself.

The motion was seconded by the VICE-PRESIDENT and carried unanimously.

REPORTS OF COMMITTEES.

FINANCE.

The report of this Committee was of the usual character. It recommended the payment of sundry accounts, and the investment of £100 on account of the Benevolent Fund.

The PRESIDENT, in moving that the report be received and adopted, said there was nothing special to call attention to in the receipts, except in respect to the subscriptions on the Benevolent Fund account. Something like £500 had been received, many of the members when remitting their subscriptions to the Society sending at the same time a subscription to the Benevolent Fund. On the donation account also, an old and much respected member and a former officer of the Society, Mr. Wm. Scott Brown, had been kind enough to send £100. Though Mr. Brown had been incapacitated for some time from taking an active part in the business of the Society, it was very gratifying to find that he still remembered it and its wants. He should have much pleasure in conveying to him on behalf of the Council its appreciation of his liberality. The payments were also of the usual character, except the investment of the £100 which was necessary under the regulations, the interest only of donations being available, together with subscriptions, for direct application in relief of distress.

The report was unanimously agreed to.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£5 to the widow (aged 52) of a registered chemist and druggist, who has had three previous grants of like amount. (Gloucestershire.)

£5 to the widow (aged 39) of a registered chemist and druggist. Applicant's husband died in December, 1887, leaving his wife and six children wholly unprovided for. The eldest child, a boy, 15, is earning 2*s.* 6*d.* a week. (Lancashire.)

£10 to the widow (aged 81) of a registered chemist and druggist. Applicant has had three previous grants of like amount. (Wiltshire.)

£10 to the widow (aged 42) of a member from 1853 to 1887. Applicant had a similar grant in May last, and has five children dependent on her. (Yorkshire.)

Two applications had not been entertained, and one had been deferred for further inquiries.

The VICE-PRESIDENT, in moving the adoption of the report and recommendations, said there was nothing in the cases which required special remark. In one which had not been entertained it appeared that the applicant was in receipt of fifteen shillings a week from a son, and five shillings a week from another relative, and the Committee therefore felt that though the case was a good one, it was not so pressing as some others. He wished, however, to call the special attention of the Council, and of all friends of the Benevolent Fund, to two letters which had come before the Committee with regard to the question of getting children into orphanages. One was from the widow of a member who desired to get one of her children into such an institution, but she said she found that friends and

sympathizers could do nothing to help her in this direction unless they were subscribers to the institution, and on obtaining the list of subscribers to the Reedham Asylum, which seemed most suitable, she found no chemists and druggists amongst them. She subsequently stated, however, that she had succeeded in getting one child into the Wolverhampton Orphanage. The second letter referred to the case where a young man, an Associate of the Society, had recently died, leaving a wife and two children, and the only assistance asked from the Benevolent Fund was to help in getting one of these children into an orphan asylum, or into Christ's Hospital. He should be very glad if any member of the Council or of the Society could help in either of these cases. There was also the case of some orphans in which the Council took a great interest for some years, of whom nothing had been heard for a year, and the Committee thought it would be well that some inquiry should be made.

Mr. CROSS asked if the Council had ever considered the question of subscribing to an orphanage. He had recently visited the one at Wolverhampton, to which reference had been made, which appeared to be just the institution which was suited to the case of the members, and it struck him that if the Council subscribed to it, so as to have a right of nomination, it would be a useful way of utilizing some of the funds.

Mr. RICHARDSON said it had often occurred to him that this would be a very good plan, and he thought the time was now come when a move might be made with reference to the education of the children of the poorer brethren. There was scarcely a benevolent institution in the country as large as that one but made some provision for the education of orphan children. If some rich outsider would start such a movement by a handsome donation he should be happy to contribute towards it and others would do the same.

Mr. ALLEN said it had occurred to him that something of the kind might be done, especially as he had recently observed that a benevolent institution in London in connection with the dramatic profession had an arrangement with certain orphanages, by which, in consideration of certain payments, it was allowed to nominate children.

Mr. ROBBINS remarked that the desirability of doing something of this kind was recognized some years ago, but on inquiry it was found that it would cost something like £160 a year to secure a nomination, and therefore the idea had to be given up.

Mr. RICHARDSON said that a fund should be formed, to which subscriptions might be given, and each year one nomination might be made.

Mr. ROBBINS said a large amount of money would have to be paid for each child nominated.

Mr. CROSS said the nomination he referred to was merely the right to nominate for election. It would be a very invidious task for the Council to have to select one candidate every year. The institution he referred to was essentially a middle-class orphanage, and the difficulty at the present day was to confine the operation of these charities to the class for which they were originally intended. There was no difficulty in getting a boy or girl elected if it belonged to the middle-class, because there were so few applicants of that class that the subscribers would vote for them at once. He could illustrate that by a case which had just happened in which a child had been elected the first time. There was always a plethora of applications from the lower stratum of society; but the persons who came within the operation of the Benevolent Fund were just those who would come within the sphere of operations of these orphanages. The power of nomination was conferred by a subscription of a guinea, and that would also give two or more votes.

Mr. ROBBINS said he had never been applied to for a nomination, or he should be always ready to give one; the applications to him were always for votes.

Mr. HAMPSON suggested that this matter should be considered by the Committee.

Mr. BUTT said the system at most orphanages was that anyone who desired to be elected must be in the first place nominated by two or three subscribers, but there was no difficulty about that; the difficulty was in getting the votes afterwards.

Mr. HAMPSON thought very likely if the Council had the power of nominating, the child so nominated would have a better chance of being elected. It would be at once a direct appeal to all members and friends who were subscribers.

Mr. ATKINS hoped the suggestion would receive the consideration of the Committee, but he could not agree with Mr. Cross that there was any lack of suitable candidates for middle-class orphanages.

Mr. HAMPSON thought the most painful feature of the whole matter was the process of election.

Mr. RICHARDSON said he took a considerable interest in masonic charities, which were essentially connected with the middle-class, and he could only say that both in the boys' and girls' schools there were always about one hundred candidates for twenty vacancies.

The PRESIDENT thought it would be very well for the Committee to consider the suggestion, and obtain information from the Wolverhampton and other charities. It was quite possible that an annual subscription, as had been suggested, might be worth more than the mere number of votes which it would confer, and if a large outlay were not involved it might be a very useful mode of employing the funds. Personally, he thought it would be a good thing if an arrangement could be made for providing for the children of deceased members, and he reciprocated what Mr. Richardson had said on that point; if there were any members of the Society who desired to associate themselves with some new departure in connection with the Benevolent Fund that would be a good direction in which to start; but the tendency of those who took an interest in philanthropic work generally was rather in favour of affiliating all great institutions with existing charities rather than creating separate ones, and the Committee would probably consider whether there were any orphanages and schools of a certain class to which subscriptions might be given.

The motion was then put and unanimously agreed to.

THE ANNUAL REPORT.

The Council then went into committee to consider the annual report. On resuming, it was resolved that the report and financial statement be issued with the voting papers for the election of Council. The report and financial statement will be found on pp. 881–885.

ELECTION OF A MEMBER OF COUNCIL IN PLACE OF MR. SYMES.

The PRESIDENT said the Council had to elect a gentleman to fill the vacancy caused by the resignation of Mr. Symes, and he begged to propose the election of Mr. John Harrison, of Sunderland. Mr. Harrison had taken a very active interest in all pharmaceutical matters for many years, he was a man of exceptional ability and activity, and although Sunderland was a considerable distance from London, he believed that, if elected, Mr. Harrison would attend to the business most conscientiously. Mr. Harrison had appeared there on a former occasion to urge views which were then to a certain extent antagonistic to those of the majority of the Council, but from what was seen of him then and since, it was quite evident that his views on all matters connected with the Society and trade matters generally were of the soundest possible character. Mr. Harrison had also the advantage of representing the chemist and druggist members, and though personally he could have wished that he had been a pharmaceutical

chemist, but he should be sorry to deprive the chemist and druggist class of the honour reflected upon it by the accident of Mr. Harrison not being a pharmaceutical chemist. He was quite sure that the whole of that class of members would be much gratified by the election of Mr. Harrison to a seat at the Board; not only on the general grounds of Mr. Harrison's great ability, unceasing activity and sympathy for all pharmaceutical matters, educational as well as trade, but also on the special ground of his being a chemist and druggist member. He thought a better selection could not be made.

The VICE-PRESIDENT desired to endorse all that had been said as to the desirability of electing Mr. Harrison to fill the place so ably filled for many years by Mr. Symes. Mr. Harrison had taken an active interest in pharmacy and pharmaceutical politics for many years. The chemist and druggist section was entitled under the Statute to be represented on the Council by seven members, and he believed at one time there were one or two such members, but why they had been allowed to drop out he did not quite know; or why Mr. Harrison had not been there before. At any rate he should be very glad to welcome him, and hoped he would long retain a seat at the Board.

The motion was carried unanimously.

THE LATE MR. FREDERICK BARRON.

The PRESIDENT said intelligence had been received during the sitting of the Council of the decease of an old member of the Society and a munificent donor to the Benevolent Fund, Mr. Frederick Barron. He thought it would not be right for the Council to separate without placing on record its regret at the loss of one who was in every sense a friend to pharmacy, and to the Society as a whole, and who had not only shown from time to time much hospitality to the Executive officers, but had been always ready to assist in every good and charitable work. Mr. Barron had reached the ripe age of 80 years, but remained active up to the last, and some years ago, in anticipation of the possibility of his decease, he made a very handsome donation to the Benevolent Fund. He begged to move—

> "That this Council has learned with great regret the death of Mr. Frederick Barron, a former Auditor of the Society, also a munificent supporter of the Benevolent Fund, and desires to express its sympathy with the family of the deceased in the loss they have sustained."

The VICE-PRESIDENT seconded the motion. He had known Mr. Barron ever since he knew anything of pharmacy. He first made his acquaintance when Mr. Barron travelled in Kent, and had had the privilege of his friendship ever since. At all times his kindly disposition, not only towards the Society at large, but towards everyone connected with the trade, was well known; in fact he was as large-hearted a man as he had ever met with. It was very pleasant to find that in his higher position he never forgot or overlooked those who had been associated with the trade, and who were sometimes in very adverse circumstances. Mr. Barron had not only helped the Benevolent Fund generally, but to his knowledge he often gave assistance privately. He only hoped Mr. Barron would be succeeded by others who would take as much interest in pharmacy and pharmacists as he had done.

The motion was then put and carried unanimously.

REPORT OF EXECUTIVE OF NORTH BRITISH BRANCH.

The following report from the Executive of the North British Branch was read:—

Report of the Executive of the North British Branch.

"The Executive of the North British Branch has now to submit the following report on the work of the year from March, 1888, to March, 1889.

"At a meeting of the Executive held on April 11, 1888, it was arranged that the annual election should take place on June 20, 1888. In pursuance of this arrangement the present Executive was elected at a meeting of members and associates in business of the Society, residing in Scotland, held on the above date.

"The Executive has held three meetings during the year. At the first meeting Messrs. Henry Bellyse Baildon, and James Watt, Haddington, were elected Chairman and Vice-Chairman, respectively; and the resident members were appointed a General Purposes Committee to deal with business arising in the interval between meetings of the Executive.

"At the second meeting of the Executive a letter was received from Mr. Baildon resigning the Chairmanship, in consequence of his having felt compelled to resign his position as a member of the Council, and Mr. William Gilmour was elected Chairman in his place.

"The General Purposes Committee has met twice, and has had charge of the arrangements for Evening Meetings and the alterations in the Examination Rooms.

"At the meeting of Executive on October 24, 1888, the following were nominated for election by the Council as the Board of Examiners for Scotland for 1889:—William Inglis Clark, David Brown Dott, Adam Gibson, William Gilmour, Alexander Kinninmont, Thomas Maben, John Nesbit and John Bertram Stephenson.

"The financial statement up to December 31, 1888, has already been forwarded to the Council.

"From the following particulars it will be seen that the departments connected with the Branch continue in a satisfactory condition.

"*The Examinations.*—All the examinations continue to be conducted much the same as at the date of last report. The improvements in the dispensing department referred to in last year's report, have now been fully carried out in accordance with the recommendation of Messrs. Gibson and Nesbit, who visited London in April last for the purpose of seeing the new arrangements there. The examination in this department is now conducted with greater comfort to the candidates, and the Examiner reports that the change has proved entirely satisfactory.

"*Evening Meetings.*—The evening scientific meetings of the Society in Edinburgh have been continued during the past session, five such meetings having been held. A number of interesting and valuable papers have been read, and the Executive again desire to record their thanks to those gentlemen who have rendered such valuable service in this way. The attendance at the meetings has been well sustained, the last meeting of the session having been the largest that has been held for some years. While this is so the Executive still feel that these meetings might be even more largely taken advantage of.

"*Library.*—A considerable number of new and valuable books have been added to the Library, partly by donation, but mainly by purchase. The catalogue has again been revised and brought up to date, and a new edition printed along with that of the London Library. The various weekly and monthly journals continue to be largely read by those who visit the rooms, and the Library is taken advantage of to an increasing extent for purposes of reference. It continues to be visited by scientists, medical men, and members of the University teaching staff. The appreciation of the Library continues to grow, and the Executive has again to report that the circulation of books shows a steady increase, as will be seen from the following statement:—

	1887-8.	1888-9.
April	66	56
May	69	116
June	60	98
July	61	56
August	27	37
September	36	77
October	39	60
November	76	62
December	53	62
January	60	65
February	84	79
March	96	106
	727	874
		727
Increase		147

"This increase is due to some extent to the great demand for the many new and standard works recently added to the Library. The circulation of books to provincial chemists, though still much higher than in previous years, shows a slight decrease on last year's returns. During the twelve months (1887–8), 116 volumes were circulated to readers outside Edinburgh and Leith. During the twelve months (1888–89) 65 volumes have been so circulated.

"*Museum.*—Some valuable donations have been made to the Museum during the year, and the Executive desire to express their thanks to the various donors. The collection has also again been considerably enriched by the addition of duplicate specimens from the Society's Museum in Bloomsbury Square. The students' specimens of materia medica have been very largely taken advantage of, and the whole collection has again been overhauled and replenished, wherever necessary.

"The attendances at the Society's Library and Museum in Edinburgh are shown by the following table:—

Attendance of Visitors during the Year from March, 1888, to March, 1889.

		Day.	Evening.	Total.
1888	April	302	124	426
	May	179	95	274
	June	183	65	248
	July	209	68	277
	August	59	closed	59
	September	104	closed	104
	October	218	143	361
	November	132	120	252
	December	201	98	299
1889	January	275	128	403
	February	140	98	238
	March	172	100	272
	Totals	2174	1039	3213
	Totals for previous twelve months	2103	1094	3197
	Increase			16

"The above indicates a slight increase on the previous twelve months and may be regarded as highly satisfactory. The general conduct of students leaves nothing to be desired.

"The Library and Museum continue to be largely taken advantage of for reference both by metropolitan and provincial chemists.

House.—The house and furnishings, and also the stable and coach-house are all in good order. Some necessary repairs have been done, but the only exceptional expenditure has been in connection with the alterations in the laboratory, rendered necessary in consequence of a re-arrangement of the dispensing department. Five years have now elapsed since the opening of the present House, and as some cleaning and painting has become necessary, the Executive recommend that it should be done during the holidays in the autumn.

"April 24, 1889. "WILLIAM GILMOUR, *Chairman.*"

The PRESIDENT moved that the report be received and entered on the minutes. It was very satisfactory to hear that the state of the Society's premises and proceedings in Scotland was so good. All the details appeared to be very carefully supervised, and there was now a place at the disposal of members in Scotland perhaps almost as good as that in London. There was an excellent Museum, the nucleus of a good library, and, as was well known, the facilities for examination were very good. As far as he could observe a large part of this success was due to the excellent services rendered by the assistant secretary, Mr. Hill, and he thought it was only due to him to put that on record.

Mr. ROBBINS seconded the motion. He thought the report was highly satisfactory.

Mr. HAMPSON said this report was a very important one, as it gave such full details of the work carried on, and it was very gratifying, because it showed the improved condition, not only in the working of the various departments of the Society in Scotland, but in the success of all those departments, and it showed there was a growing feeling of attachment and amity towards the parent Society. There was a great deal of work yet to be done in Scotland, and he hoped in future there would be a large accession of strength from the ranks of Scotch chemists. After all, everything depended on the numbers attached to any Society; however splendid a report might be presented by any body such as their own, unless it were thoroughly backed up by the mass of the trade it would not have the importance that was desirable. Not only in Scotland, but in England also, the Society needed a great accession of strength from those who were at present outside the ranks.

Mr. WATT said it was very gratifying to him to hear the complimentary remarks which had been made, and he could assure the Council from personal knowledge that the Society's premises in Scotland were looked upon there as the centre for pharmacy, and were largely taken advantage of. No praise could be too high for the excellent work done by Mr. Hill, the assistant Secretary, who performed his duties with great zeal, perseverance and intelligence. The success attained was also due in large measure to the efforts of the Executive in Edinburgh, and especially of the Chairman, Mr. Gilmour.

Mr. ATKINS also wished to add his testimony to the good work done in the north, and how thoroughly it was shown that the Council did the right thing in securing important and suitable premises. He thought the subjects which had been introduced at the evening meetings, and the able way in which they had been debated were quite in accordance with the position the Society ought to take in a city so distinguished for its literary and scientific work as Edinburgh.

The motion was adopted, and words were added to the resolution approving of the recommendation with regard to painting and cleaning, at the end of the report.

LIBRARY, MUSEUM, LABORATORY AND HOUSE.

Library.

The report of the Librarian had been received, including the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
March	Day	480	26	8	18
	Evening	201	17	2	10

STATEMENT OF ATTENDANCE OF MEMBERS OF COUNCIL ON COMMITTEES FOR THE YEAR 1888–89.

	Committees held Once a Month or Oftener.		Committees held Occasionally.		Special Committees.	Total Number of Attendances.
	Finance.	Library, Museum, Laboratory, and House.	Benevolent Fund.	General Purposes.		
Number of Committee Meetings held.	12	13	12	11		
Allen (*London*)	12	12	*	11	9	44
Atkins (*Salisbury*)	*	11	10	9	2	32
Bottle (*Dover*)	0	10	12	11	19	52
Butt (*London*)	*	11	12	11	9	43
Carteighe (*London*)	12	13	1	11	27	64
Cross (*Shrewsbury*)	9	6	*	10	2	27
Evans (*Llanelly*)	7	2	*	7	*	16
Gostling (*Diss*)	4	*	*	4	2	10
Greenish (*London*)	*	11	11	11	12	45
Hampson (*London*)	*	11	*	10	4	25
Hills (*London*)	12	10	*	11	8	41
Martin (*Newcastle-on-Tyne*)	10	*	*	11	3	24
Newsholme (*Sheffield*)	10	*	*	11	3	24
Nichol (*Carlisle*)	*	*	8	10	*	18
Richardson (*Leicester*)	*	8	*	7	2	17
Robbins (*London*)	*	13	10	8	9	40
Savage (*Brighton*)	7	7	*	8	*	22
Schacht (*Clifton*)	7	1	*	7	10	25
Southall (*Birmingham*)	*	*	7	8	*	15
Symes (*Liverpool*)	*	*	2	2	0	4
Watt (*Haddington*)	*	*	4	5	2	11

NUMBER OF ATTENDANCES OF MEMBERS OF COUNCIL AT COUNCIL MEETINGS FOR THE YEAR 1888–89.

Allen, Charles Bowen	11	Gostling, Thomas Preston	7	Richardson, John George Fredk.	11
Atkins, Samuel Ralph	10	Greenish, Thomas	11	Robbins, John	11
Bottle, Alexander	11	Hampson, Robert	10	Savage, William Dawson	10
Butt, Edward Northway	10	Hills, Walter	11	Schacht, George Frederick	8
Carteighe, Michael	11	Martin, Nicholas Henry	11	Southall, Alfred	9
Cross, William Gowen	11	Newsholme, G. Thos. Wilkinson	11	Symes, Charles	9
Evans, Gwilym	9	Nichol, Anthony	10	Watt, James†	5

Number of Meetings during the year, 11.

* Not appointed on this Committee.

† Elected to the Council, November, 1888.

Circulation of books.	Town.	Country.	Total.	Carriage paid.
March . . .	177	155	332	£2 3 3½

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

For the Library in London—

School of Pharmacy Students' Association, Papers, Session 1887–88. From the ASSOCIATION.

Medical Register, 1889.
Medical Students' Register, 1889.
Dentists' Register, 1889.
From the GENERAL MEDICAL COUNCIL.

Victoria, Pharmacy Board, Report, 1888.
From the BOARD.

Queensland, Pharmacy Board, Pharmaceutical List, 1889. From the BOARD.

College of Preceptors, Calendar, 1889.
From the COLLEGE.

Béhal (A.), Composés azoïques, 1889.
Gautier (H.), Recherches sur les chaleurs de formation des chlorures d'amines de la série grasse, 1888.
— Action chimique des courants électriques, 1889.
Klobb (T. C.), Lois des doubles décompositions chimiques, 1889.
Lafont (J.), Des phénols, 1889.
Leidié (E.), Mercure et ses composés, toxicologie, 1889.
Ouvrard (L. V. R.), Lois des doubles décompositions chimiques, 1889.
Patein (G.), Densités de vapeur, leurs variations, 1889. From the ÉCOLE SUPÉRIEURE DE PHARMACIE DE PARIS.

Bernays (A. J.), Notes on Analytical Chemistry, 3rd ed., 1889. From the AUTHOR.

West (W.), Additions to the Algæ of West Yorkshire, 1889. From the AUTHOR.

General Index to the Glasgow Medical Journal, 1828–88. From the GLASGOW AND WEST OF SCOTLAND MEDICAL ASSOCIATION.

Journal of the Chemical Society, 1888.
Berichte der deutschen chemischen Gesellschaft, 1888. From Mr. WALTER HILLS.

For the Library in Edinburgh—

Victoria, Pharmacy Board, Report, 1888.
From the BOARD.

The Committee recommended the purchase of the undermentioned works:—

For the Library in London—

Davis, Practical Microscopy, 2nd ed., 1889.
Roscoe and Schorlemmer, Treatise on Chemistry, new ed., vol. 2, pts. 1–2.

The Committee ordered that the Library and Museum be closed from Thursday, April 18, at 5 p.m., until 9 a.m. on Tuesday, April 23.

Museum.

The Curator's report had been received, and included the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
March	Morning	488	43	9	18
	Evening	123	16	1	4

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Specimen of a root from Maranham.
From Messrs. EVANS, LESCHER AND WEBB.

Specimen of a bark from Brazil.
From Messrs. BROOKES and GREEN.

Specimens of the fruit and plant of *Ephedra monostachya*, Russian sarsaparilla, tormentil root, comfrey root and *Ledum palustre*.
From Mr. J. FUERGENSON, Dorpat.

Specimen of Daroo wood. From Mr. D. S. KEMP.

Specimen of a medicinal root from Central Africa.
From Messrs. FERRIS and Co., Bristol.

To the Society's Museum in Edinburgh—

Two specimens of Bael fruit.
From Mr. J. T. COATS, Edinburgh.

The annual report had been considered in draft, and its further consideration deferred to an adjourned meeting.

The communication from the International Congress on Hygiene had been considered, and it was recommended that the President and Vice-President for the time being be appointed to represent the Society on the Congress Committee.

At an adjourned meeting on April 30 the draft report had been finally revised and agreed to.

The PRESIDENT in moving the adoption of the report and recommendation said it was thought most convenient that the President and Vice-President for the time being should be appointed to act on the provisional committee which was to arrange for a grand congress in London in 1891.

The motion was unanimously agreed to.

LAW AND PARLIAMENTARY COMMITTEE.

Railway Rates.

This Committee had met and considered the question of the proposed new railway rates. It recommended that a Sub-Committee be appointed to draw up and send a memorial on the subject to the Board of Trade.

The report also stated that the Committee had had the advantage of the presence of Mr. Umney during its discussion of the subject.

The PRESIDENT in moving the adoption of the report said it had reference to the Railway Rates Bill, which had been carefully considered by the Committee, who recommended that a memorial should be sent to the Board of Trade and the railway companies urging substantially that no serious change should be made in the present rates. Without going too much into detail he might say that it was proposed to suggest that drugs and chemicals in hampers and cases should be retained in Class 4, and not be put in Class 5, which paid a higher rate; also that "smalls," instead of being treated in the way proposed, should be charged on a diminishing scale, according to the amount of freight itself, on similar lines to those adopted in what was called the Clearing House book, which was regarded by the railway companies as an authority. The "smalls" formed an enormous feature in the carriage paid by chemists and druggists, and a railway company necessarily had to charge relatively more for small packages than large. But in the opinion of the Committee there was an undue discrepancy between the tonnage rates and those proposed to be charged for these small articles. Lastly, it was proposed to urge that empties should not be placed in a higher class than No. 2. These recommendations it was proposed should be sent in stamped with the seal of the Society, and he had no doubt they would be received with respect and consideration. No doubt there would be something to be said on the other side by the railway companies, and it was only fair to recollect that the smallness of the packages, and the smallness of the total amount of carriage paid on an average by the chemist, necessarily told against him. With regard to classification generally it seemed incongruous that a hamper of mineral water weighing 1 cwt. should be charged less than a hamper of rhubarb of the same weight, and it was believed that by approaching the railway companies through the Board of Trade, not in too hostile a spirit, some concessions might be obtained, and that if the trade did not get lower rates

in future, at any rate it would not have to pay more. The Committee was quite aware that the rates mentioned in the Bill would not necessarily be charged by the companies, as some people seemed to think. The rates mentioned were maximum rates, which the companies could charge, their object being not to be debarred charging more than they now did at certain times or within certain limits; but he thought it was very desirable that the railway companies should come to an understanding with special classes of traders like the chemists, that under ordinary circumstances they would not charge more than a certain specified scale. He would move that the report be adopted, and that the seal of the Society be affixed to the memorial.

Mr. ATKINS was very glad the Society was moving in this matter, though he did not know that it could hope to be of much service; but at any rate it would be acting in harmony with the trade interests, and with other important bodies. An additional reason for action was the fact alluded to by the President, viz., the smallness of the commercial transactions of chemists as a body in the matter of carriage, which might cause their interests to be overlooked. He did not know how far the companies would avail themselves of their powers, but he was anticipating an improvement in the matter of carriage, and was amazed to find from the discussions which had taken place that the general impression seemed to be that higher rates were going to be exacted. The importance of this question to country chemists could hardly be appreciated by Londoners; it really amounted to a second rental, and a heavy one to any man doing anything like a business. He was interested in a London company, to which he should be glad to give his orders, but the cost of carriage was quite prohibitive. Then, again, with regard to empties, he remembered the time when they were carried at a mere nominal charge, but now they were charged much more, and it was proposed to put them in a higher class still. It was said that possibly the companies would not use the powers they would possess, but, except where checked by competition, he thought that was hardly consistent with human nature.

Mr. HAMPSON was very glad the Council had thought fit to use its influence in the same direction as other bodies in connection with this very important matter of railway rates. It would have been a dereliction of duty to have remained silent. It was often said outside that the Council took no cognizance of trade questions, but whether that were so or not this matter certainly came within the sphere of its duty, and he was quite sure the decision of the Council was a wise one. He had no doubt that the memorial would be properly received and would have its due weight. Reference had been made to the small amount of carriage paid by chemists, but the small amount of their receipts must also be borne in mind. Railway companies could not be expected to send goods free, but it was necessary to do what was possible to make the rates low. Where one company only had possession of a district where it was virtually a monopoly, it was absolutely necessary that the State should exercise some control and see that only fair rates were charged.

Mr. WATT was also very glad to see the Council disposed to protect the trade interests of chemists and druggists. This was a matter of the greatest importance to those who lived a long distance from London, and as the influence of the Council must be very great he trusted that now it had begun in the right direction it would continue in it.

Mr. ROBBINS said he thought the Society had some weight, and it would go to support the influence of other bodies, such as the Chambers of Commerce. He was not disposed to think chemists were going to be charged enormous rates, for the companies had had power in the past to charge much more than they had been in the habit of doing, and he did not think they really intended to make the maximum charges the real ones. Still he also believed that they were only kept in check by the opposition of the Chambers of Commerce and traders generally.

Mr. EVANS said this Act originated in the complaints of the farmers as to the inequalities of railway rates, whereby in some cases goods could be brought from New York to London more cheaply than they could from Liverpool. The railway companies, with their usual tact and discretion, allowed the Act to pass, but in such a form that they could, if they liked, increase their rates by 50 per cent. Instead of reducing the inland rates they proposed to equalize matters by increasing those from foreign countries. He hoped this memorial, in conjunction with others which were being prepared, would induce them to take a more reasonable view. He had very little confidence in their consciences when they had no opposition. He had had the misfortune to live in a single line town, but when another line came there it was found that the railway companies assumed a totally different tone, and were more in the position of asking favours than granting them. He hoped the Board of Trade would keep down the maximum rates.

The PRESIDENT then moved that the report be adopted, and that the President, Vice-President, Mr. Gostling and Mr. Martin be appointed the committee to prepare the memorial. This was unanimously agreed to, as was a subsequent resolution authorizing the seal to be affixed.

REPORT OF EXAMINATIONS.

April, 1889.

ENGLAND AND WALES.

	Candidates.		
	Examined.	Passed.	Failed.
Major (9th)	3	2	1
„ (10th)	4	2	2
„ (11th)	3	2	1
„ (12th)	4	2	2
„ (16th)	7	4	3
„ (17th)	7	3	4
	—28	—15	— 13
Minor (9th)	31	15	16
„ (10th)	30	12	18
„ (11th)	32	11	21
„ (12th)	28	11	17
„ (16th)	24	10	14
„ (17th)	22	9	13
	—167	—68	—99
Modified (16th)	1	0	1
	—	—	—
	196	83	113

SCOTLAND.

	Candidates.		
	Examined.	Passed.	Failed.
Major (23rd)	1	1	0
Minor (16th)	13	7	6
„ (17th)	12	5	7
„ (18th)	12	8	4
„ (23rd)	12	8	4
„ (24th)	13	6	7
	—62	—34	—28
Modified (24th)	1	1	0
	—	—	—
	64	36	28

Preliminary Examination.

Sixteen certificates of approved examining bodies were received in lieu of the Society's Preliminary examination.

GENERAL PURPOSES.

The report of this Committee included the reports from the Professors on the examinations for the winter course, the substance of which was as follows :—

Practical Chemistry.

Professor Attfield reported that twenty candidates had competed for the bronze medal and certificates in his class.

Botany.

Professor J. R. Green spoke very highly of the paper to which he had awarded the first place, and scarcely less so of the second and third, and with regard to all the papers said that with two exceptions they fully came up to his expectations. There were twelve competitors, and the Professor suggested that the examinations should be compulsory on all attending the lectures. The practical examination, which was a new feature, had been very satisfactory.

Materia Medica.

Mr. Holmes reported that twelve candidates had competed in this class, the majority of whom obtained more than 50 per cent. of the possible marks, and the one who stood first got the full number. The examination, which was both written and practical, had been very satisfactory.

Pharmacy and Practical Pharmacy.

Mr. Ince reported that thirteen candidates had competed for this medal, five of whom obtained more than 75 per cent. of full marks; the first on the list obtained the full number.

Chemistry.

Professor Dunstan reported that twenty students had competed in this class, the merits of some of them being so evenly balanced that he was unable to distinguish between the third and fourth, both of whom, therefore, he recommended for a certificate. Whilst the next paper with the motto "Toujours a toi" was so close up that he deemed it worthy of honourable mention. This being the first session of recent years in which a course of lectures has been arranged extending over the whole session, it was very satisfactory to find that during the first or elementary part of the course the interest of the students had been maintained in a much greater degree than under the old system. This was shown by the unusually large proportion entering for this examination.

Acting on the above reports, the Committee recommended that the following awards be made:—

Practical Chemistry.

Bronze Medal .....George Sydney Fuller.
Certificates of Honour ... Thomas Woodruff. / John Brooks Thornley.

Chemistry.

Bronze Medal .....John Brooks Thornley.
Certificates of Honour ... Harry Dixon Fuge. / (Equal.) Alfred Latchmore. / Richard Henry Norman.

Botany.

Bronze Medal .....Harry Dixon Fuge.
Certificates of Honour .. Alfred Latchmore. / William Thomas Jones.

Materia Medica.

Bronze Medal .....Harry Dixon Fuge.

Pharmacy and Practical Pharmacy.

Bronze Medal ....Harry Dixon Fuge.

Solicitor's Report.

The usual letter had been received from the solicitor. In one case which went for trial two penalties and costs had been recovered. Several cases were awaiting the collection of evidence.

Five cases had been considered by the Committee, and in each instance proceedings were recommended.

A report had been received from Mr. R. O. Fitch, the Divisional Secretary for South Hackney, giving the result of a canvass in his district, for which the Committee tendered him its thanks.

The portion of the report relating to the Professors' reports having been agreed to, the Council went into committee to consider the remainder.

After some discussion the Council resumed, and the report and recommendations of the Committee were unanimously adopted.

PRELIMINARY EXAMINATION.

A meeting of the Board of Examiners for England and Wales was held on Thursday, May 2, 1889.

The Report of the College of Preceptors on the Examination held on April 9 was received.

Four hundred and thirty-seven candidates had presented themselves for examination, of whom *two hundred and four* had failed.

The following *two hundred and thirty-three* passed, and the Registrar was authorized to place their names upon the Register of Apprentices or Students:—

Adams, William Stewart .....Dundee.
Adamson, Andrew .....East Wemyss.
Allen, George .....Crewe.
Allen, John Wilfred .....Douglas, I. M.
Askham, Harry Joe.....Rotherham.
Atkin, Frederick Charles D. ...Cambridge.
Ayre, Henry.....South Molton.
Bagshaw, Robert Reece.....Levenshulme.
Bainbridge, Algernon R. Cyril.York.
Barker, Robert.....Aldborough.
Barrett, Rees .....Talley.
Barton, John .....Lower Ince.
Barton, John English.....Aspatria.
Bell, Robert John .....London.
Benington, Philip .....Liverpool.
Bertles, Saml. Richd. Gorst. ...Warrington.
Betts, Harold George.....Smethwick.
Bingham, Frank ....Masborough.
Blackwood, Wm. Smellie Spence Muirkirk.
Braddock, William.....Oldham.
Brander, William .....Turriff.
Brauer, Fredk. Hy. Ferdinand.Prestwich.
Brown, John ..... Edinburgh.
Brown, John Arthur .....Ripley.
Buckland, John Daws ....Hucknall Torkard.
Burnett, Charles Johnson .....Dufftown.
Burrows, Harry .....Southgate.
Bushnell, Edward Lewins.....Abergele.
Burton, Percy H.....London.
Butterfield, Frank .....Blackburn.
Butterfield, Harry .....Blackburn.
Butterworth, Hy. Lindsay.....Oswaldtwistle.
Buxton, Albert.....Cockermouth.
Cameron, Lauchlan.....Brighton.
Campbell, Colin .....Glasgow.
Cay, Armistead Geo. Winson...Exeter.
Chambers, Geo. Higinson Fayle.Taunton.
Chantrill, William Ernest.....Birmingham.
Chapman, Frank Ernest.....Great Yarmouth.
Charlton, Wm. A. I'Anson.....Newcastle-on-Tyne.
Chrystall, Robert.....Forres.
Clarke, John.....Liverpool.
Clarkson, John..... .....Wigan.
Cole, Frederick William.....Dartford.
Cook, J. C.....Glasgow.
Cooke, Charles Woodfin.....Market Drayton.
Coulson, Horace .....Cambridge.
Cowpe, Henry Fisher.....Preston.
Crichton, George..... .....Kilmarnock.

Daniels, Charles .....Ripon.
Dann, Charles .....Whittington Moor.
Davey, Ernest James .....Cheltenham.
Davies, Robert Fisher.....Pontardawe.
Davis, Henry.....Riverhead.
Dawson, Hy. Gray Woodhouse..Derby.
Dealve, Albert Ernest.....Tavistock.
Denton, John Gill .....Pontefract.
Dixon, Arthur Steele .....Ambleside.
Dodd, Arthur Myddleton .. ...Chester.
Donaldson, Hugh .....Kilmarnock.
Dowson, Charles Beevor . ....Norwich.
Dunbar, John .....Dufftown.
Duncan, James.....Turriff.
Dunn, Benjamin Sydney ..... Fareham.
Dunn, Samuel Edwin.....Hazel Grove.
Eden, William James.....Manchester.
Ellisson, James Bradley .....Hoyland Common.
Ettles, John.....Elgin.
Evans, David .....Carmarthen.
Ewart, Samuel.....Dalbeattie.
Exell, Edmund Charles.....Sheffield.
Fenton, Richard .....Blackburn.
Fish, William Sadler .....Doncaster.
Fletcher, Charles Senior .....Liversedge.
Florence, Alexander Andrew...Aberdeen.
Francis, Arthur Edward .....London.
Fryer, John William .....Brigg.
Gane, Charles Hillman .....Nottingham.
Garwood, George James.....Norwich.
Gay, Valentine Henry .....London.
Gedge, Horatio Wm. Turner...Clifton.
Gerhold, Henry Archer .....Cardiff.
Gilbart, Sidney Frederic .....London.
Grayson, William .....Pickering.
Gregory, Arthur .....Weymouth.
Greig, Charles John .....Scalloway.
Greig, John Sangster .....Aberdeen.
Grierson, George.....Thornhill.
Griffith, John Richard .....Port Dinorwic.
Griffiths, Arthur Daniel.....St. Clears.
Griffiths, Frederic Gray..... Manchester.
Guyer, Richard Glode .....Torquay.
Hale, Giles.....London.
Hall, Arnold.....Grantham.
Hall, Herbert .....Manchester.
Hall, Robert Beeching .....Folkestone.
Harley, David ....Burntisland.
Harrison, Frederick Charles...Durham.
Harry, Elias .....Carmarthen.
Hatfield, Victor John.....Southampton.
Heap, Robert Edwin .....Shelton.
Henry, Thomas Anderson .....Barrow in Furness.
Highfield, Henry.....Darnall.
Hislop, Isaac .....Dundee.
Hogg, Richard.....Glasgow.
Hogg, Walter .....Ulverston.
Holmes, John .....Bradford.
Hopkins, William Edward ...Llandovery.
Humphrey, Walter Edwin.....Louth.
Innes, John ....Portgordon.
James, Frederick .....London.
Jones, Herbert... .....Newport, Mon.
Jones, James Evan.....Pontypridd.
Jones, John Daniel.....Aberystwith.
Jones, Morgan Richard .....London.
Kennedy, Alexander .....Auchterless.
Lawrence, Alexander.....Little Brighton.
Leggott, George William .....Hull.
Lewis, William Spencer .....Farnham.
Lister, James .....Perth.
Littler, John .....Frodsham.
Lloyd, Douglas Macbean .....Wolverhampton.
Long, Edward Frank .....Chichester.
Lucas, Harry Feaver .....Cradley Heath.
McCallum, Alexr. Phimister...Buckie.
McDonagh, Edmund Charles..London.
Macdonald, James Maxwell ...Goole.
MacGregor, Charles Andrew...Devonport.
McKerlie, John .....Dumfries.
McKinnell, William Clarke ...Northampton.
McLean, John ....Glasgow.
McLeod, John D.....Kirkcaldy.
Makepeace, Arthur Benedict..London.
Mason, Alfred Harry .....Luton.
Masterman, Henry .....Sowerby.
Matthews, Harold Evan.....Cirencester.
Medley, Fred ....Barnsley.
Menhinick, John.....St. Mabyn.
Midgley, Arthur James Hy. ...Goole.
Miller, Alexander .....Glasgow.
Mitchell, Henry Searle .....Truro.
Molson, Algernon Heanley ...Sleaford.
Morgan, Thomas Alcwyn ..... Gwernogle.
Morgans, David .....Llansawel.
Mortimer, William Henry.....Taunton.
Moss, George Henry ....Chester.
Murray, Donald Sutherland ...Edinburgh.
Nicholson, George Barker.....Thirsk.
Nicoll, John .....Edinburgh.
Oakes, Edwin York .....Bridgnorth.
Orton, Edward Charles .....Foleshill.
Parry, Frederick George.....Stockton-on-Tees.
Pearson, Percival Edward.....New Brompton.
Pick, William .....Boroughbridge.
Pilgrim, Horace Granville.....Selby.
Pirie, George Finlayson.....Arbroath.
Plant, Thomas.....Hanley.
Pooley, Arthur Henry.....Norwich.
Porter, George Betton .....Driffield.
Prichard, David Llewelyn K...London.
Richards, Evan William .....Hirwain.
Roberts, Frederic.....London.
Robson, Walter .....Rugeley.
Rodger, James..... .....Dundee.
Rose, Wm. H. Thos. Rampling Lowestoft.
Ross, William Neil.....Partick.
Ruff, William .....Whitby.
Russell, Joseph Jackson.....Cleator.
Russell, Robert .....Lerwick.
Sadler, Walter.....Tamworth.
Sanders, Edward Colin .....Liverpool.
Seath, John A.....Dunfermline.
Shirtliff, Wm. Edwd. Daniel...London.
Short, John .....Edinburgh.
Shorthouse, Herbert Stephen Birmingham.
Sim, William .....Paisley.
Siminson, Thomas .....Warminster.
Skertchly, William Pearson...Derby.
Skitt, James Henry..... .....Silverdale.
Smith, Albert George.....Liverpool.
Smith, Joseph Thomas K. .....Dumfries.
Smith, Percy .....Gloucester.
Smith, Thomas William.....Whitby.
Smith, Wm. Hy. Harold .....Cromer.
Solly, Charles .....Brockley.
Spence, Thomas .....Musselburgh.
Stalker, John Falconer .....Perth.
Stobie, James .. ..Alloa.
Stockbridge, Frank Herbert...Weston-super-Mare.
Strachan, James Emslie .....Montrose.
Sutherland, Alexr. George ...Dundee.
Tasker, Jno. Hy. Anthony.....London.
Tattersall, John .....London.
Taylor, Abraham.....Eccleshill.
Taylor, John.....Pontefract.
Templeton, John.....Kilmarnock.
Thomas, David Llewellyn.....Willenhall.
Thomas, Hugh William.....Carnarvon.
Thompson, Edward Charles ...Sedgley.
Thomson, Charles .....Cullen.
Tilbury, Robert .....Andover.

Tiley, Arthur Percival .....Frodsham.
Tindale, Joseph Edward .....Whitby.
Tod, Adam Allan.....Bishop Auckland.
Trail, Stephen Gatt .....Fraserburgh.
Trubshaw, James Harold .....Uttoxeter.
Turner, William .....Birmingham.
Turton, Edwin E. H. .....Nottingham.
Walkey, William Richard.....Devonport.
Waller, John .....Stanley.
Wardale, Francis Charles.....Boston.
Watkins, James Giles .....Portsmouth.
Watson, Arthur Theodore.....Ripon.
Wedderburn, Charles George..Aberdeen.
Wharton, George Edwin .....Hastings.
Wheeler, John Frederick .....Ramsgate.
Whitaker, Albert.....Nottingham.
Whitby, Ernest Clucas ....Widnes.
Whitehead, John .....Manchester.
Whyte, William .....Glasgow.
Wilkie, David Thomson.....Lichfield.
Wilkinson, Arthur Joseph.....Rochdale.
Williams, George.....Redruth.
Williams, William Richard ...Llandilo.
Wing, John Joseph .....Boston.
Winterbottom, Arthur .....Batley.
Wolseley, Marion Josephine....Kings Horton.
Wolstenholme, Jesse .....Manchester.
Worswick, Frederick..... .....Wigan.
Wray, Thomas.....Haydon Bridge.
Wrothwell, Fredk. James H....Northallerton.
Young, Alexander .....Kinross.
Young, Herbert George.....Shanklin.

The questions set at this examination were published in the *Pharmaceutical Journal* for April 13, p. 829.

The following is a list of the centres at which the examination was held, showing the number of candidates at each centre and the result:—

	Candidates.				Candidates.		
	Examined.	Passed.	Failed.		Examined.	Passed.	Failed.
Aberdeen	19	14	5	Jersey	1	0	1
Birmingham	18	14	4	Lancaster	5	4	1
Brighton	3	1	2	Leeds	19	10	9
Bristol	8	5	3	Lincoln	5	3	2
Cambridge	5	1	4	Liverpool	17	11	6
Canterbury	6	2	4	London	59	26	33
Cardiff	9	5	4	Manchester	43	18	25
Carlisle	10	6	4	Newcastle-on-T.	14	4	10
Carmarthen	16	7	9	Northampton	3	1	2
Carnarvon	7	2	5	Norwich	8	6	2
Cheltenham	5	3	2	Nottingham	16	9	7
Darlington	4	3	1	Oxford	2	0	2
Douglas	1	1	0	Peterborough	5	2	3
Dundee	12	8	4	Sheffield	13	7	6
Edinburgh	24	12	12	Shrewsbury	6	4	2
Exeter	7	5	2	Southampton	10	6	4
Glasgow	21	13	8	Truro	9	5	4
Hull	10	5	5	Worcester	3	0	3
Inverness	1	1	0	York	13	9	4

Proceedings of Societies in London.

LONDON CHAMBER OF COMMERCE.

Chemical Section.

The Railway Rates Question.

A meeting of the Chemical Section of the London Chamber of Commerce was held on Monday last, at Botolph House, Eastcheap, to consider the report of the Committee upon the question of the railway rates. Mr. Thomas Tyrer occupied the chair.

The Chairman said this was a meeting, not of the Committee merely, but of the members of the chemical drug trade who were interested in this very important matter. The working out of the multifarious details and the considerations which had gone to make up the report had been in the hands of a Committee which had certainly met regularly and worked very hard. The Chamber was particularly indebted to Mr. W. A. Francis and Mr. Umney for the trouble which they had taken in the matter. With regard to that portion of the railway rates which did not relate to drugs very little reference was made to it, except in the Interim report of the Committee, of which Mr. Boulton was the chairman, and he thought that very much depended upon the classification.

The Secretary then read the following:—

"*Copy of Objections discussed and agreed upon at the London Chamber of Commerce by the wholesale Druggists' Sub-Committee of the Chemical Section.*

"The classification of drugs and chemicals, both as at present and as proposed, is capable of very great improvement, and it is much to be wished that a systematic classification were adopted; without, however, attempting to supply such a classification they call attention to the following particulars, which are of great importance:—

"*Drugs and Chemicals* in hampers and cases are composed to a large extent of articles in Classes C, 1, 2, 3, 4.

"In Class C such as alum, bicarbonate of soda.

"In Class 1 such as bicarbonate of potash, pearl ashes, sugar of lead, orange peel.

"In Class 2 such as borax, carbonate of ammonia, chlorate of potash, nutgalls.

"In Class 3 such as aniseed, cream of tartar, vaseline, boracic and oxalic acids.

"In Class 4 such as citric, tartaric and carbolic acids, honey, cod liver and olive oils, medicinal seeds.

"Drugs and chemicals are packed in hampers, etc., by experienced packers of glass ware, who do nothing else.

"Claims for breakage are of rare occurrence, and invariably for small amounts, and they do not, when made, exceed on the average the proportion of one shilling for each £100 worth of goods carried. In comparison with the value the weight of the consignments is considerable—an average value of the consignments by wholesale druggists being about 70*s.* per cwt. Now as the value of goods in Class 4 is from 40*s.* to 150*s.* per cwt., the advance from Class 4 to Class 5 would be a gross injustice to the druggists. Moreover, the drug trade would be at a great disadvantage as compared with drysalters who trade in many articles similarly classified.

"Further, it must not be lost sight of, that the druggist's business is unique in requiring that his goods should be consigned so that the odour of one drug shall not in any way be communicable to another, hence it is that the packing of his wares in green glass bottles and earthenware jars is a necessity, and so considerable a proportion do these packages form (which when empty are classed in Classes 1 and 3), that their average weight is at least 25 per cent. of the whole consignment.

Empties.—The business of the druggist necessitates the use of bottles and jars for liquids and solids; these are in the main so different from those used by other trades, that they could rarely be sold by the retail druggists for other purposes. It is, therefore, absolutely necessary that every facility for their return to the wholesale druggist be given. The empty returns consist almost entirely of 'dirty glass bottles and earthenware jars.' Now 'new bottles and earthenware jars' are carried in Classes 1 and 3, therefore dirty bottles, etc., should not be placed in a higher class than Class 2. The injustice of putting empties in Class 5 is further shown by the fact that each consign-

ment of empties never amounts to 560 lbs. in weight, and therefore comes under the head of 'small packages,' for which the proposed maximum charges would in many instances far exceed the actual value of the empties and thus render their return impracticable.

"*Ammonia Liquid.*—Some of the industries having vast capital sunk in plant, are working by processes which have no chance of success, except by the utilization of their waste products (of which ammonia liquid is one), and need all the facilities for trade that can possibly be given. When ammonia liquid is packed in glass bottles of ½ gallon capacity, in which a large portion of the trade is carried on, the glass bottle (classified when empty in Class 1) forms at least 40 per cent. of the weight of the total consignment. Being of low value, the transfer of this article from Class 3 to Class 5 will be a great hardship to the drug and chemical trade.

"*Glycerine.*—A third class rate would be sufficient for this article, as it is securely packed in tins contained in strong cases, and is, therefore, not liable to be easily damaged. This substance is now largely used for a variety of purposes, and the advance to a fifth class rate would undoubtedly check trade in so useful an article.

"*Honey.*—No objection is made to putting 'honey in jars' in Class 4. But honey in casks or tins contained in cases is not liable to be easily damaged, as the packages are strong. This class of honey is of a lower average value than the goods in Class 3, in which it was formerly classified, and should, therefore, remain in that class.

"*Lime or Lemon Juice, or Lime or Lemon Juice Cordials.*—These should be left in Class 2, as heretofore. There is a developing trade in these articles. They are of great use to the community at large as antiscorbutics, and are really articles of food developing temperance in a marked degree. The value is small, they are easily handled, and are not liable to breakage or leakage. When there is such a large increased consumption, and transport of beers, spirits, etc., it is clearly to the advantage of the community that the lowest possible rates be charged for articles like lime and lemon juice.

"*Castor Oil.*—Objection is made to this article being raised from Classes 2 and 3 and included with other 'oils' in Class 4, as it is largely used as a lubricant for stationary and marine engines and for manufacturing purposes. Much of the oil imported is sold at £22 per ton. The advance to Class 4 would seriously affect the trade in this useful commodity.

"*Cod Liver Oil.*—Objection is made to this article being raised from Class 2 and included with other 'oils' in Class 4. The traffic in this oil is of considerable magnitude for a medicinal agent—several thousand barrels of it (weighing about 250 lbs. each, and of an average value of 80*s.* per barrel) are sent annually into this country from Norway and other places. The freight from the Norwegian ports into London or Hull being only about 4*s.* per barrel, equal to about 36*s.* per ton, the withdrawal of this oil from its previous classification will fall hardly upon the poorer classes of Great Britain and Ireland, as much is distributed gratuitously by means of hospitals and infirmaries.

"*Olive Oil.*—The use of this oil for dietetic purposes has, with much advantage to public health, increased to no inconsiderable extent during the past few years, and it is desirable that even on this account every facility should be given for increased rather than restricted traffic. The inferior olive oils, not adapted for eating, are used for lubricating and other purposes. In many instances no other oil can be substituted; this latter is particularly the case with many medicinal preparations for which it is largely used. The same objection to re-classification applies as in the case of cod liver oil.

"*Small Packages.*—Although wholesale druggists have an intimate knowledge of the additional cost of filling orders for small quantities, as compared with those for original packages or large bulk of goods, and do not think it would be justice to ask railway companies to carry consignments under 5 cwt. at the same *pro rata* charge as for 1 ton and upwards, they do most strenuously oppose the proposed 'double rates for smalls,' inasmuch as three-fourths of their consignments are under 560 lbs. in weight, and the cost of carriage on the bulk of their trade would be thus doubled. They are of the opinion that if some diminishing percentage charge were added on, being varied according to the amount of the freight itself, that such system would be unobjectionable, and think the table published in the clearing house book termed 'Scale of charges for smalls under 500 lbs.' is a type of what might fairly be charged under such circumstances, for it is impossible to be argued that the increased cost of carrying *smalls* is anywhere in the proportion of double the rate.

"They are also of opinion that the proposal to charge any fraction of a quarter of a ton as a quarter of ton would be very unjust in the case of consignments under one ton.

"They are also of the opinion that the weight for smalls should be left at 500 lbs., as in the former scale, but they do not press their objection to this alteration."

The Chairman then read the suggestions made by an expert called in by the Chamber, to the effect that certain information would have to be supplied in order that proper objections might be made to the Board of Trade.

Mr. Howard asked what was an "expert," because it appeared to him that the "expert" was incapable of understanding the drug trade.

Mr. Umney said the report of the expert had not been before the Committee, but with regard to his remarks upon glycerine and honey he evidently did not quite know the business as well as they did themselves. The Committee in considering their report had not merely taken the statement of one house, but they had compared the claims and the average rates of freight, and the average price at which goods would come out from four or five of the largest houses in the Kingdom, and when he mentioned that they came out within 2 or 3 per cent., he thought the meeting would agree that the Committee had not made a mistake. Their special object in meeting that day was to put before the trade the points upon which they had agreed, and which they thought it necessary to oppose. Other towns would deal with such points as terminal charges, and the Committee had merely directed attention to points which it was thought might be effectually opposed.

Mr. Preston asked what position the meeting was in with regard to the expert? Were they to understand that the Chamber placed more importance on the report of the expert than the report of the special Committee, because if so it was very little use to occupy time by entering into the question, and the only thing they could do would be to refer the whole matter back to the Committee.

Mr. Barron said as one of the Committee he was very much taken by surprise when the report was produced. He had no idea the subject was going before an expert, and thought this report to have been referred to the Committee to take into consideration before the members of the trade were called together. If he had known that anything of the sort had been taken into consideration by an expert he certainly should have suggested the adjournment of the meeting for a week. If the new rates were allowed to come into force the question of empties would be a very important one. At present the rate was simply absurd. "Small packages," like empties, affected the trade and not the customers, and the Committee particularly wanted the approval or disapproval of the meeting upon this point. With regard to terminal

charges the Committee were unanimous that the goods were so light as compared with those sent by other trades that they need not deal with the matter.

Mr. Evans thought the expert was not an expert in the drug and chemical trade, but an expert as to the best means of putting objections before the Board of Trade, which all individual traders and associations were empowered to do under the Act. Before the objections were put before the Board of Trade it would be desirable that they should be put into a proper form, and it might be interesting to the meeting to know that in Liverpool a meeting of the Liverpool Chemists' Association was held on Saturday, when certain objections to be submitted were affirmed. He might perhaps be permitted to read these:—(1) That goods are sold by chemists and druggists at less profit than formerly, and that it would be unfair to farther diminish the profit by large increases in the rates of carriage. (2) That the present rates are amply remunerative and higher than those charged for similar services in other countries where the circumstances are comparable. (3) That the increases proposed would in many cases force traffic which would naturally go by rail to water and road conveyance, causing immense delay and inconvenience. It would be specially injurious in the case of the goods dealt in by the objectors and highly prejudicial to the convenience and interests of the public. (4) That before the railways obtain control of the Grand Junction Canal druggists' goods of the classes now proposed to be charged 104*s*. per ton were carried for about ¼th that rate between London and Liverpool. (5) The proposal to make the additional charge on smalls 100 per cent., instead of 10 per cent. or 15 per cent., as at present, is exorbitant, and especially oppressive to chemists and druggists, seeing that nearly the whole of the goods they use come under that definition, and necessarily so, on account of being required in fresh condition. (6) Packages of goods consigned to retail druggists are made up of a number of articles, Classes C, 1, 2 and 3, such as alum, soda, bicarb. ammonia, crem. tart. and vaseline, the proportions of the higher class being very small. The average value of the drugs is not greater, but rather less than many goods in lower classes, and less liable to damage in transit, being more securely packed. For these reasons we think that drugs should be classed lower, and not higher, than formerly. (7) Chemists cannot carry on business without returning empty bottles, packages, etc., and seeing that they pay a higher rate on receipt it is obviously unfair that on returning the packages they should have to pay the high rate chargeable in Class 5, whereas they come under rates already provided for in the lower classes. In some instances these high rates of carriage on returns will be in excess of the value of the articles.

Mr. Preston thought the meeting would approve of the general spirit of the report of the Committee, but in consequence of an expert having been employed by the Chamber of Commerce, he would suggest that the matter be referred to the Committee already appointed. He did not think there was any use in entering into the question which had been debated by the Committee, and as it was quite clear that in order to place the matter satisfactorily before the Chamber of Commerce a further report must be made, it was desirable at once to recognize the labours of the Committee, and to adjourn in order to give them an opportunity of looking more closely into the matter.

The Chairman said with regard to the expert he did not pretend to have any knowledge of the business, but he had to collate the reports, and in doing so he had made certain criticisms. The report having been read he could not see the use of postponing the meeting, as the meeting was not at all bound by his opinion.

On the motion of the Chairman Clause I. of the report as to drugs and chemicals in hampers was agreed to.

Empties.

Mr. Martin (Newcastle) thought the reasons of the railway companies for putting these goods in the classes in which they had been put should be ascertained before anything further was done.

Mr. Howard said the railway companies were not bound to give any reasons until they came before the Board of Trade.

Mr. Martin referred to the fact that 80 per cent. of the claims made at Newcastle against railway companies were from druggists, and that there was no salvage from these claims. He thought they should put themselves in the position of the railway companies, when they would be better able to meet the arguments which would no doubt be produced on behalf of the railway companies before the Board of Trade.

Mr. Umney said the railway companies could not have any rhyme or reason for their classification, or they would not have removed drugs from Class 4 and put them into Class 5 with such things as dead horses, bottles, mercury and pianos. As to the claims made the figures were not imaginary, but were actual figures, and he was prepared to prove that the claims were under 1*s*. per £100.

Mr. Preston said he never knew a case were a breakage occurred in which there was not some salvage.

Mr. Boulton said the maximum rates in the new schedule were higher than those formerly charged, and companies were already trying to enforce them.

The clause as to empties was then agreed to, as was also that relating to ammonia liquid, etc.

Small Packages.

Mr. Evans said the experience of wholesale houses was that a very much larger proportion than three-fourths of their consignments were under 560 lbs. in weight.

The Secretary observed that the wholesale grocers sub-committee had that morning agreed to recommend 2 cwt. as the limit.

Mr. Howard said that as 561 lbs. would be charged as half a ton it practically meant that the rates would be doubled. After going through the matter carefully he came to the conclusion that the Clearing House scale was better than a fixed minimum. The average consignment of chemists was less than 2 cwt., and therefore this limit would not do for them.

Mr. Umney said he had taken out 100 of his firm's invoices and he found they weighed under 200 lbs.

Mr. Evans moved that the word "three-fourths" should be struck out, and "four-fifths" inserted in their place.

Mr. Preston seconded the motion, which was agreed to.

The Chairman said the Committee were of opinion that the weight for smalls should be left at 500 lbs., as in former scales, but they did not press their objection to this alteration. He should be glad to have the opinion of the meeting as to whether the latter words should be omitted.

Mr. Umney said if the companies would treat druggists in a reasonable manner and adopt the Clearing House scale it might be as well to leave in the latter words, but, if not, it would be as well to take them out.

The Chairman said upon the whole he thought it would be better to omit the words "but they do not press their objection to this alteration," and in this view the meeting concurred. He then moved that the report as amended be referred to the Committee for the addition of the examples, and for the reconstruction of any part of it which was not in accordance with the resolution of the meeting. With regard to the resolutions of the Liverpool chemists, which had been read by Mr. Evans, they could be put before the meeting for their guidance.

Mr. Howard moved as a rider—"That it is essential that the transmission of small quantities of inflammable and corrosive liquids be provided for, the present arrangement being such that it is impossible to send such consignments as are required in retail quantities."

Dr. Messel seconded the motion.

Mr. Umney thought it would be better if this was put as a special resolution instead of a rider.

Mr. Howard having expressed his willingness to adopt the suggestion, the motion was carried.

Mr. Umney then moved "That the report referring to the drug trade section the subject of alterations discussed and agreed this day, be referred to the Committee with instructions to add examples and confer in their discretion with the expert in order that the terms be drafted into suitable phraseology for transmission to the Board of Trade and the railway companies."

Mr. Evans seconded the motion.

Mr. Barron asked whether the Chamber would employ counsel, or whether it would be necessary for the Section to employ counsel.

The Secretary said it was not proposed to employ counsel, as they could not be heard before the Board of Trade. It was proposed that a spokesman should be appointed to represent the different sections.

The motion passed unanimously.

Mr. Barron proposed that a guarantee fund should be started in order that the Committee have it in their power to do what was right for the trade. He said he should be happy to head the list with five guineas.

Mr. Hodgkinson seconded the motion, which was carried, and several gentlemen at once put down their names as guarantors.

General Chemical Trades Sub-Section.

Mr. Boulton presented the following interim report of the proceedings at a meeting of the General Chemical Trades' Subsection Committee:—

"The Tar Distillers' Association, which consisted of about thirty manufacturing chemical firms in various parts of the United Kingdom, had met to consider the question, and had arrived at certain resolutions. In the first place they did not see that, under the new Act, there should be any addition to the rates at all. The Act had been passed to prevent undue preference and to redress grievances, and there was no excuse for the Railway Companies to take advantage of it by raising the rates. They, therefore, objected generally to any addition to the maximum rates which had hitherto existed. In the next place, they objected to any addition to the terminal charges being agreed to unless some work or service was done in return.

"Then, going into details, the Tar Distillers' Association objected to the classification of various articles. For instance, coal tar pitch, which could be loaded and unloaded as easily as coal and is not more dangerous or difficult to send or to handle, should be put into Class A instead of C.

"Coal tar, creosote or heavy oil of tar, and gas liquor or ammoniacal liquor, when carried in owner's tank trucks should be removed from Class C to A.

"Crude anthracene from Class 3 to C, and 'anthracene, except otherwise herein provided,' should be put in Class C instead of 5.

"Crude carbolic acid (liquid) and carbolic acid solid, disinfectants, or crystals, should be put in Class C, and sulphate of ammonia from Class C to B.

"The Committee then made the following additional recommendations:—

"Chromate ore from Class C to A.

"It was suggested that alkali, which under the new schedule is withdrawn from classification, should be included in Class A, but that in no case should a higher rate be made than 1¼*d.* per ton under 20 miles or 1*d.* per ton over that distance. The above to include all solid chemicals, such as caustic soda, soda crystals, etc., in wagon loads of 4 tons and upwards.

"It was stated that 'copperas' was included in Class 1, whilst sulphate of iron was put in Class C, but, as the two terms were generally considered as synonymous in the trade, it was suggested that 'copperas' should be included in Class A.

"Silicate of soda should be removed from Class 1 to A.

"Sal ammoniac and borax from Class 2 to C.

"Saltpetre and caustic potash from Class 1 to A.

"Chemicals (not dangerous, corrosive, or explosive) in casks, iron drums, bales, or bags, from Class 3 to C.

"Bichrome and bichromate of potash in casks, from Class 1 to A, and coal, fuel, patent, from Class B to A.

"The Committee further considered the classifications suggested by the Manchester Chamber of Commerce, copies of which had been handed to them by Mr. Tyrer.

"It was pointed out with regard to the classifications suggested by the Manchester Chamber that tar distillers as a trade would require certain modifications therein. For instance, as already noted above, 'anthracene' should be placed in Class C, whereas it answers to the description of articles which, in the Manchester Chamber's list, are included in Class 1. Carbolic acid should also be included in Class C. The Committee wished to further remark that the schedule drawn up by the Manchester Chamber appeared to partake of a new classification, departing from the system adopted by the railway companies in their published schedules, and that there might therefore be some difficulty in following the course suggested by that Chamber.

"It was mentioned by the Chairman that the manure manufacturers of London appeared to be working through their own association.

"During the proceedings two letters were read from interested members, making certain suggestions, most of which were embodied in the Committee's recommendations. No representative from the manufacturers of acids having attended on the Committee, the Chairman requested that the Secretary would write to Dr. Rudolph Messel asking him for his views on the subject. S. B. BOULTON, *Chairman*."

Mr. Boulton said when the Committee met before they had not the advantage of the particulars as to the alizarine trade, which was now a very important one. Alizarine was formerly in Class 3, but it was now proposed to put it in Class 4. The principal markets for this article were Glasgow and Manchester, and the rates to his mind were altogether excessive. He had lately received letters from twelve firms suggesting slight modifications, but in the main they agreed with the report. He asked that the Interim report might be supplemented by recommending the rates suggested by the British Alizarine Company and others.

Dr. Messel said acids were not yet classified, and the general view of the trade was that until they were no action should be taken.

Mr. Boulton said after this remark the Committee could hardly bring forward the question of acids, but the acid trade must bear in mind that if they were unclassified they would be at the mercy of the railway companies.

Mr. Hillbrook said there had been interviews with the managers of the different railway companies, and the views of the trade had been placed before them, which were to be taken into consideration and a decision given by May 1. Until the reply of the companies was known they did not wish to take any action.

Mr. Boulton said, as Chairman of the Committee, he should be happy at any future time to receive suggestions from gentlemen interested in the acid trade.

Mr. Howard moved that the interim report be agreed to, with the additions mentioned, and that the Committee be requested to add the details of evidence which are necessary to bring before the Board of Trade.

Mr. Boulton seconded the motion, which was carried.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Benger, Smith, Arthur, Johnston, Tichborne, Bayley, Rodgers, Robinson, Hornsby, Hyslop, Powell, Allen, Thompson, Austen, Walker, Hill, Elector, Ephestris, Phaque, Qualified Chemist.

THE CURRICULUM—HOW WOULD IT WORK?

BY W. JOHNSTON,
Pharmaceutical Chemist.

It has often struck me that much of the opposition to the Pharmaceutical Society's Education Bill has arisen more from misconception as to the scope and *modus operandi* of the proposal than from any want of sympathy on the part of pharmacists with education *per se*. Perhaps a few thoughts from one who has thought much on the matter may help to remove this misconception.

The phases of the question which chiefly call for attention are these :—"Would it be a hardship to apprentices or students?" and "Would it cause inconvenience to their employers?" In a few cases it might, but I venture to think they would be very few indeed. The curriculum would not be of the nature of a revolution in the trade—only a step forward in the path of progress. It has been said that it would be a harsh thing to make a young man go to the expense of a course of lectures and laboratory training, when he had little money to spare for that purpose, and no one to help him much. I believe that such so-called "harshness" would be more apparent than real. I can best prove that, not by elaborate arguments, but by briefly sketching the career of one who was just as the above, but who, nevertheless, voluntarily went through a curriculum as extensive as that now proposed, and subsequently passed both Minor and Major examinations. I may say that I know him intimately, and can vouch for the accuracy of the facts. He commenced his four years' apprenticeship, about the age of fifteen, in a small Scotch town of some fifteen or sixteen thousand inhabitants. It was in a mixed business where three other apprentices and an assistant were employed, and where for the first year he had to officiate as errand boy, shop-sweeper, fire-lighter, and "general bottle-washer." Spare time was filled up in boxing pills, wrapping seidlitz powders and serving little odds and ends, such as hair oil and bleaching powder. His office was by no means a sinecure, but he consoled himself with the thought that another would step into his dirty shoes in a twelvemonth's time, and that during his second year he would be promoted to making the stock pills, copying the prescriptions (of which there were often over twenty new ones a day), and, occasionally, to doing a little dispensing in a small way.

During his second year he passed his Preliminary, much regretting that he had not been compelled to do so before entering on his duties, because of the loss of time for more important studies. I may remark, parenthetically, that I consider it very unkind of masters to take in pupils before this examination has been passed, both for the reason just stated, and because so many afterwards find themselves unable to get through, and so have the best training time in their lives wasted. The provisions of the Curriculum Bill are not stringent enough in this respect : masters ought to be *prohibited* from taking apprentices till they have passed.

During his third year my friend's duty was to keep up the stock of ointments and plasters (spread) and to assist with the dispensing, etc. Fourth year's work, to make tinctures and suppositories, dispense, make out bills, assist in keeping the books, etc., etc., of course, not forgetting the retail counter, *pro re nata*. At the expiration of his term he came south to England, knowing that he would be better paid than in the north. After spending some four years in a large midland town, and saving sufficient to pay school fees, he took a situation in London, where he arranged to have time to attend the morning lectures at Bloomsbury Square and Regent's Park Gardens, and studied hard in the early morning and after shop-closing time. It was uphill work, but the best thing he could do under the circumstances, for he had to "cut the coat to suit the cloth." Next year he studied for several hours daily in the Society's Laboratory, afterwards passing the Minor with ease and comfort. After recruiting his shattered finances by a year's spell of full time in a good situation, he again went on "short" (more ways than one!), and once more placed himself under Professor Attfield's care. An occasional run out to Kew kept up his botany ; and ultimately he became a fully-fledged pharmaceutical chemist. He sometimes thinks that if he had his time to come over again he might not be so eager to spend his hard-earned savings on the Major ; but often emphatically declares that he would not part with the extra *knowledge* he had to acquire to pass it for ten times the amount that that knowledge cost him. These are my sentiments, too. So much for the alleged harshness of the curriculum on poor students. Of course there are many men (all honour to them!) who have received no other scientific training than what they have given themselves, and who have attained to Minor and Major distinctions ; but I think these will, almost unanimously, admit that they would have been better men still if they *had* gone through a regular course of instruction. I have heard some of them say so.

Let me try to picture further the "manner of working," of what I sincerely hope will soon be the new *Act*. I will suppose, as a first case, that a youth has been unfortunate in the selection of a 'prentice master; and that at the end of his "time," he finds he has had no instruction either in dispensing or science. The best thing he can then do will be to look out a place where he can, in exchange for say half a day's work, have board and lodging, a trifle of pocket money, and teaching in prescription reading and dispensing, and elementary botany, chemistry, pharmacy and materia medica, sufficient to enable him to pass the written first portion of the qualifying exam. Anyone who has passed the present Minor should be able to teach him enough. After that—if his friends were "substantial"—he would enter on his curriculum ; or, if he could not afford that straight away, he would then be able to get more or less of a salary for a few years, whereout he could save the price of his college course.

I will next sketch the rough outlines of a model case. Make your embryo chemist stay at school till he has got over the Prelim., or its equivalent. Pay a good premium and indenture him with some one who has a dispensing business, and who is capable of guiding his studies intelligently. Give him easy hours—say 10 to 1, 2 to 5, and 7 to 9 ; or, if it was thought desirable that he should learn to dust and drudge a bit—as generally it would—let him begin earlier in the morning, but cut a corresponding slice off the premium. Let him be taught, practically, all the subjects needed

for the first half of the Minor ; or, if preferred, let him attend classes, again reducing the premium. Give him a thorough grounding in dispensing and pharmacy—such as emulsion, pill, ointment, and tincture making, plaster spreading, shop routine, pharmacy law, microscopy wherever possible, etc., etc. Chemistry and materia medica should be started, too, at the commencement—one or two hours being set apart every day for that purpose. In a few months, typical prescriptions of each class should be selected from such a book as 'The Art of Dispensing,' or some of the advertised collections, and given him to try his hand at, working with small quantities. The recent suggestion from Edinburgh as to experimental plaster spreading on brown paper is a good one, and deserves to be made a note of. His progress should be frequently tested during spare half hours. With perseverance and diligent study, he ought, by the end of his third year, to be a good dispenser and a useful assistant, and ought to be able to pass Minor number one easily. If of suitable age, then would follow his curriculum at one or other of the town or country schools, which would be approved, for that purpose, by the Council. He would now be able to take a more intelligent grasp of the numberless facts pressed on his notice ; and would finally emerge trained and ready for the Examiners. Then instead of being one of the miserable 40 or 50 per cent. of passes, as at present, he would help to swell the grand total of 80 or 90 per cent., as is the case in Germany. He would now be nearly ready for his vocation in life. I say "nearly" advisedly. I do not refer to his not yet being a Major man, because that is of secondary importance, but to the fact of his having had too little experience yet (from a commercial point of view) to begin business on his own account. I should strongly recommend him to take situations in different parts of the country, or of the world, for a few years, so as to widen his knowledge of life, and provide him with a fuller equipment of "trade wrinkles." For his own sake and the sake of his customers, I think no one should become a principal till he has had six or eight years' experience, unless under exceptional circumstances.

Between these two extreme cases, there would be all shades and degrees of difference, but injustice never, either to employers or employed. Those who are already in the trade would have their rights respected, and would probably be allowed to go up for examination, *sine curriculo*, at their leisure ; whilst all who entered the calling in future would do so with their eyes open, and well knowing what was before them.

There is a question that is often asked, and it is this :—"If you are going to make students do all this, what are you going to give them in return ?" Now, I do not think that is at all a fair question, because it assumes that the curriculum would be an evil, which it certainly would not. The question practically amounts to this :—"You are going to confer one great boon upon them ; how many more will you give them if they accept it ?" (Q. e. a.) It has been said that the curriculum will not earn a man his bread and cheese. No ; but in this intensely scientific age, it will often *help* to do so. Show me two men, equal in business ability and character, and placed under exactly similar conditions, the one with a thorough education, the other with only half or quarter of an education, and I will predict to you, to a certainty, which will make the most money in a given period of time. Of course the curriculum will never make a good business man out of a fool ; but it will always make a smart man a smarter.

It has pained me to see that a few of my countrymen on the other side of the Tweed are opposed to this Bill—some of the Glasgow chemists, for example. Scotchmen are generally found in the van, when education is on the move ; but, this time, Glasgow seems to be in the "guard's van !"

I should like to reply at greater length to the query, "Is the game worth the candle ?" but respect for the editor's space compels me to forbear, at any rate, at present. There is one more point that claims a word, however. What effect would the curriculum have on the schools ? As foreshadowed by Mr. Learoyd, in Sheffield, the other day, one effect would be the greatly increased prosperity of provincial schools, and rightly so, I think. Notwithstanding that, I do not fear that the London schools would suffer the loss of one halfpenny. I mean the really good ones. Some of them would have to extend their courses of lectures a bit, and increase their fees ; but both these are very simple matters. The number of students requiring collegiate training would be so much greater than now, that these teachers would be amply compensated for the loss the country schools would otherwise have caused them. And then, what a splendid chance for the postal system, in helping to prepare apprentices for the first Minor, in outlying districts where it might not be quite convenient to get the theoretical information otherwise.

In short, I believe *the curriculum would work beautifully*, and might be a stepping-stone to something better before long. Who knows ?

METHYL-ORANGE AND OTHER INDICATORS.

BY ALFRED H. ALLEN.

In the *Pharmaceutical Journal* for April 20, page 849, appears the report of a paper by Mr. D. B. Dott, in which he calls attention to the variable quality of commercial methyl-orange and expresses a preference for litmus. In the discussion which followed, Dr. Inglis Clark and Mr. Gibson endorsed this view, while Mr. Hill found that certain results obtained by the use of phenolphthalein as an indicator differed from those obtained with litmus, which latter he considered the most reliable.

It seems rather to have been overlooked that phenolphthalein is by no means a mere *substitute* for litmus, but an indicator having a distinct use and capable of application in cases where litmus wholly fails. The same observation applies, though less strongly, to methyl-orange, which has its own particular uses, and for some of these it cannot be replaced by litmus.

That the methyl-orange of commerce should be of variable quality is a very serious disadvantage. Personally, I have not met with faulty specimens,* for although I have used methyl-orange very frequently for years past, my original stock is not yet exhausted. In order that the genuine or defective nature of specimens of methyl-orange may be more easily recognized I give the following description of the colouring matter in question.†

* I should esteem it a favour if any chemist who has defective methyl-orange in his possession would send me a small sample of it.

† Taken essentially from the long-delayed, but now complete Volume III., Part I., of 'Commercial Organic Analysis.'

Methyl-orange, also called *Helianthin*, *Poirrier's Orange III.*,* *Tropæolin D.*, *Gold orange*, and *Mandarin orange*, is the sodium or ammonium salt of dimethyl-amido-azobenzene-sulphonic acid, or parasulphobenzene-azodimethylaniline, a body produced by the action of dimethyl-aniline on diazobenzene-sulphonic acid. The following is the formula of methyl-orange :—

$$\left.\begin{matrix}C_6H_4\\SO_3Na\end{matrix}\right\} N:N.C_6H_4.N \left\{\begin{matrix}CH_3\\CH_3\end{matrix}\right.$$

Helianthin or methyl-orange forms an orange-yellow powder, readily soluble in hot water, but only sparingly in alcohol. The aqueous solution is orange-yellow, and is not precipitated by alkalies. On adding hydrochloric acid to a hot, concentrated aqueous solution, the free sulphonic acid is precipitated in microscopic needles, which soon change to small, strongly lustrous plates or prisms having a violet reflection. Concentrated sulphuric acid dissolves helianthin with reddish or yellowish-brown colour, the solution appearing yellow in thin layers. On copious dilution the liquid becomes a splendid red. The solution is precipitated by barium chloride, but not by calcium chloride. Basic acetate of lead throws down the whole of the colouring matter as an orange-yellow precipitate. Magnesium sulphate added to a dilute solution of helianthin precipitates the colouring matter in microscopic crystals.

Silk and wool when immersed in an acid solution of helianthin are dyed a fiery orange. The dyed fibre is turned red by hydrochloric acid, and yellow by strong sulphuric acid, but alkalies produce no change.

The yellow colour which methyl-orange imparts to aqueous and alcoholic liquids is changed to red by a powerful acid, but is wholly unaffected by weak acids. Thus the titration of sodium carbonate by sulphuric or hydrochloric acid can be effected in the cold, if helianthin be used as the indicator of neutrality, the carbonic acid liberated having no effect on the colouring matter.

The following acids are wholly unindicated by methyl-orange, and hence the base of their salts can be titrated by hydrochloric acid in the cold just as though the acids were absent:—carbonic, hydrocyanic, hydrosulphuric, arsenious, silicic, boric, oleic, stearic, palmitic, carbolic, etc. With oxalic, acetic, butyric, succinic, lactic, tartaric, and citric acids, inaccurate results are obtained ; but sulphuric, hydrochloric, and nitric acids give sharp end-reactions. The following salts are neutral to methyl-orange, and hence their formation is an end-point of titrations in which they are produced:—$Na_2S_2O_3$, $KaHSO_3$, NaH_2PO_4, $CaH_4(PO_4)_2$, NaH_2AsO_4, $K_2Cr_2O_7$. Methyl-orange can be used to detect free acid in alum, ferrous sulphate, cupric chloride, etc. The earthy carbonates in hard water (which occasion the so-called "temporary hardness") may be at once determined by titrating the water with a mineral acid and methyl-orange.

The acid radical (and consequently the metal equivalent thereto) in copper sulphate and similar salts can be determined with great accuracy by precipitating the solution with sulphuretted hydrogen, filtering and titrating the filtrate with standard alkali and methyl-orange.

Ethyl-orange is preferred by Wieland to its lower homologue as an indicator of neutrality.

Methyl-orange is not applicable as an indicator in presence of nitrous acid or nitrites, which compounds decompose it.

From the foregoing description it appears that if doubt be entertained respecting the purity of methyl-orange it may be purified by precipitating the hot concentrated solution with hydrochloric acid. The precipitate after being washed can be dissolved in ammonia. This method of purification would probably be preferable to one based on precipitation with basic lead acetate, though magnesium sulphate might probably be employed with advantage.

It is possible that in some cases one of the allied dyes may have been supplied instead of helianthin. Thus *Orange I.* or α-naphthol yellow gives a yellowish-brown coloration or flocculent precipitate with hydrochloric acid, and is changed to red-brown by caustic alkalies. With calcium chloride it yields a red precipitate. *Orange II.* or β-naphthol orange gives a brownish yellow precipitate with hydrochloric acid in strong solutions, and the solution is changed to brownish-red by alkalies. *Orange IV.*, or diphenylamine yellow, behaves much like helianthin, though it is far less sensitive to acids, and it gives no precipitate with calcium chloride. Engel states that *Orange IV.* may be readily distinguished from methyl-orange by gold chloride, which is turned violet and then green by the former dye, while the latter becomes red. *Acid yellow* gives no colour-reaction with hydrochloric acid unless excess be used, and is not precipitated by basic lead acetate.

In choosing an indicator it is highly important to take into account the nature of the acid or base to be determined. This till recently was rarely done, chemists being usually content to proceed in a happy-go-lucky manner. The use of litmus tended greatly to maintain this state of mind, and there can be no doubt that the progress of chemistry has been seriously retarded by an imperfect realization of the nature of indicators of neutrality. All or nearly all of these are weak acids, or the salts of weak acids. In some cases the free acid is colourless or nearly so (phenolphthalein) while in others it is the salt which is comparatively colourless (*e.g.*, methyl-orange). In other cases (*e.g.*, litmus) both the free acid and the salt are highly coloured, but possessed of very different tints.

It is evident that the acid of an indicator must be weaker than the acid it is desired to determine, or the latter will not be able to displace the former from its combination, and cause the characteristic change of colour. Now dimethylamidoazobenzenesulphonic acid, the acid of which methyl-orange is a salt, is a tolerably strong acid. Its salts are decomposed completely by equivalent amounts of strong mineral acids (*e.g.*, HCl, H_2SO_4, HNO_3), but organic acids, such as acetic, oxalic, tartaric, etc., effect the decomposition very imperfectly, and hence the end-reaction is not well marked. Still weaker acids, such as boric, carbonic, hydrocyanic, oleic, etc., do not decompose methyl-orange at all, and hence their salts can be titrated just as if the bases only were present.

On the other hand, the acid characters of phenolphthalein are extremely feebly-marked, and hence its salts are decomposed by most of the acids already mentioned, including carbonic acid. Thus on blowing into a solution of phenolphthalein rendered alkaline by a drop of caustic alkali, the pink colour characteristic of the salts of phenolphthalein is destroyed by the carbonic acid of the breath. But the reaction ends sharply at the point corresponding to the formation of an acid or bicarbonate. In other words, $NaHCO_3$ is exactly neutral to phenolphthalein. Thus a dilute solution of Na_2CO_3 might be titrated with hydrochloric acid, using phenolphthalein as an indicator, and the point of neutrality, shown by the disappearance of the pink colour, would correspond to the completion of the reaction $Na_2CO_3 + HCl = NaCl + NaHCO_3$. If methyl-orange were now added and the addition of standard acid continued, the change of colour would occur at the completion of the reaction:—

$$NaHCO_3 + HCl = NaCl + H_2CO_3.$$

Phenolphthalein is not reddened by the majority of

* Orange III. is a name which is also applied to a colouring matter patented by Roussin and Poirrier, and having the constitution of a sodium salt of metanitrobenzene-azobetanaphthol-disulphonic acid.

alkaloids. Thus the acid existing in combination with an alkaloid in salts of quinine, quinidine, cinchonine, brucine, cocoaine, pyridine, and aniline can be directly titrated by standard alkali and phenolphthalein, just as if the acid were in a free state. On the other hand conine, and to a less extent nicotine, redden phenolphthalein. Atropine, homatropine and hyoscyamine do not affect phenolphthalein in alcoholic solution, but strongly redden an aqueous solution of the indicator.

One of the great practical advantages attaching to phenolphthalein lies in its applicability in alcoholic solutions, under which condition litmus is useless. Thus suppose it be desired to ascertain the free caustic alkali and the alkali existing in combination with fatty acids contained in a sample of soap. It is only necessary to dissolve a known weight of the sample in perfectly neutral methylated spirit, filter from any undissolved alkaline carbonates, borates or silicates (in which the alkali can be separately determined by methyl-orange), add phenolphthalein and titrate with standard mineral acid. The volume required corresponds to the caustic alkali. If, now, the solution be diluted with water, methyl-orange added and the titration continued, the additional quantity of acid required represents the alkali present in the form of soap.

Will any advocate for the use of litmus, and who prefers it to methyl-orange or phenolphthalein, say how he would obtain the same information in anything like so simple a manner by employing his favourite indicator? The fact is that litmus is very good and useful in its place, but is simply useless for some of the purposes to which methyl-orange and phenolphthalein may be applied.

On the other hand, phenolphthalein is inapplicable in presence of ammoniacal salts, and methyl-orange may give misleading results if employed in the arbitrary, unscientific manner still common. In a case recently described by Messrs. Cross and Bevan (*Journ. Soc. Chem. Industry*), a sample of caustic soda showed 60·73 per cent. of total Na_2O when titrated with standard acid and litmus, and 64·70 when methyl-orange was employed. Instead of blaming the methyl-orange and stating that it gave inaccurate results, these chemists investigated the cause of the discrepancy, and traced it to the presence of about 3 per cent. of alumina in the sample. When such a caustic is titrated hot in presence of litmus the final point is reached when the whole of the alkali present has been saturated with acid, and the alumina has commenced to precipitate, an observation which is in accordance with the well-known fact that aluminium sulphate is acid to litmus. When, however, methyl-orange is used the final point is not reached until not only is the soda saturated, but the precipitated alumina is redissolved, because aluminium sulphate is neutral to methyl-orange. On further investigation, Messrs. Cross and Bevan found that the neutral point to methyl-orange is attained when the Al_2O_3 and SO_3 are present in the ratio of 2:5; a result which means that 0·0212 gram of Al_2O_3 will neutralize 1 c.c. of normal acid. They conclude that (1) methyl-orange cannot be used as an indicator for titrating alkali in presence of alumina. (2) That, under these circumstances, phenolphthalein gives more reliable results than litmus. (3) That the alumina present may be determined by reckoning 0·0212 of Al_2O_3 for each c.c. of difference in the volume of normal acid required when methyl-orange and phenolphthalein are respectively employed.

With methyl-orange, according to G. Lunge, aniline acts as a base, but the end-reaction is very badly defined. With ortho-toluidine the change of colour is gradual, but with para-toluidine it is very sharp and 97 to 99 per cent. of the true quantity is indicated. Quinoline yields a tolerably sharp end-reaction and accurate results.

Chemists are indebted to Mr. R. T. Thomson for the most complete investigation of the behaviour of neutrality-indicators under various conditions. He has summarized his results in the form of a table (*Journ. Soc. Chem. Ind.*, vi. 198), and as the discussion on Mr. Dott's paper and other statements made from time to time seem to show that its teachings are not yet mastered it will form a fitting conclusion to this note. The figures represent the number of atoms of hydrogen displaced by sodium or potassium in the form of caustic alkali, when a compound is formed having a neutral reaction to the indicator in question. Thus, when methyl-orange is used in the titration of sulphurous acid the neutral point is reached when alkali has been added in quantity sufficient to form the compound $NaHSO_3$; but when phenolphthalein is used the point of neutrality corresponds to the formation of the salt Na_2SO_3.

When a blank space appears in the table it is meant that the end-reaction is obscure, and not to be depended upon.

Acids.		Methyl Orange.	Phenolphthalein.		Litmus.	
Name	Formula.	Cold.	Cold.	Boiling.	Cold.	Boiling.
Sulphuric	H_2SO_4	2	2	2	2	2
Hydrochloric	HCl	1	1	1	1	1
Nitric	HNO_3	1	1	1	1	1
Thiosulphuric	$H_2S_2O_3$	2	2	2	2	2
Carbonic	H_2CO_3	0	1 dilute	0	—	0
Sulphurous	H_2SO_3	1	2	—	—	—
Hydrosulphuric	H_2S	0	1 dilute	0	—	0
Phosphoric	H_3PO_4	1	2	—	—	—
Arsenic	H_3AsO_4	1	2	—	—	—
Arsenious	H_3AsO_3	0	—	—	0	0
Nitrous	HNO_2	indicator destroyed	1	—	1	—
Silicic	H_4SiO_4	0	—	—	0	0
Boric	H_3BO_3	0	—	—	—	—
Chromic	H_2CrO_4	1	2	2	—	—
Oxalic	$H_2C_2O_4$	—	2	2	2	2
Acetic	$HC_2H_3O_2$	—	1	—	1 nearly	—
Butyric	$HC_4H_7O_2$	—	1	—	1 nearly	—
Succinic	$H_2C_4H_4O_4$	—	2	—	2 nearly	—
Lactic	$HC_3H_5O_3$	—	1	—	1	—
Tartaric	$H_2C_4H_4O_6$	—	2	—	2	—
Citric	$H_3C_6H_5O_7$	—	3	—	—	—

It will be seen that all indicators behave alike on titrating strong mineral acids with fixed caustic alkali; in the titration of a weak acid with a strong base they differ, methyl-orange being most sensitive to alkalies and phenolphthalein to acids, while litmus occupies an intermediate place. Speaking generally, lacmoid, dimethylamido-azobenzene, cochineal, and congo-red behave like methyl-orange, while turmeric behaves like phenolphthalein. Phenacetolin and rosolic acid usually react like litmus, except that in the latter case a sharp neutrality-point is obtained in titrating sulphurous acid when the the salt Na_2SO_3 is formed.

THE BEST METHOD OF PREPARING NITROGEN FOR LECTURE PURPOSES.*

BY CHARLES R. C. TICHBORNE, LL.D., F.I.C., ETC.

An article called "A Select Method of Preparing Nitrogen Gas" appeared in the *Chemical News*, vol. lix., p. 135, and suggested to me the writing of the following communication.

The best method of preparing nitrogen for lecture experiments, or when required in a pure form, is unquestionably (in my opinion) based upon the decomposition of ammonium nitrite. That process possesses numerous advantages over all the others. It is sufficient to enumerate the simplicity of the reaction, the purity of the product, and the ease with which the experiment is performed. The apparatus required is a retort of the right size and a bent tube.

For the last ten years I have been in the habit at my lectures of falling back upon this method when I came to the subject of the oxygen compounds of nitrogen. The symmetric manner in which this reaction harmonizes with the production of laughing gas is most instructive, and is a special inducement to use it as a lecture illustration. Here we have the production of a molecule of nitrogen by the splitting up of the nitrite, whilst the nitrate gives us a molecule of the monoxide.

$$NH_4NO_2 - 2H_2O = N_2.$$
$$NH_4NO_3 - 2H_2O = N_2O.$$

A statement in the article (*Chemical News*, vol. lix., p. 135) runs as follows:—

"The action of potassium nitrite, when heated in a suitable apparatus in admixture with ammonium chloride, produces, when prepared cautiously, a moderately pure gas, but, owing to the inconsistence of the reaction, the same is rendered considerably tedious and unprofitable."

As this is contrary to my experience, I think it desirable to give the *modus operandi* which I have adopted, presuming that if the modifications and precautions which I indicate be strictly carried out the experiment will turn out satisfactorily.

Ten grams of ammonium sulphate and 10 grams of sodium nitrite are mixed in a capacious retort with 40 c.c. of glycerin and 60 c.c. of water. The retort should be of the capacity of half a litre, or about 16 ounces. The retort is placed with the neck elevated to an angle of about forty degrees, so that the water may condense and fall back into the retort. A bent tube is fitted with a cork into the neck, and conducts the gas into a wash-bottle; or it may be collected at once for general purposes without washing.

One hundred c.c. of water may be used in place of the mixture of glycerin and water, but it does not seem to work quite so regularly. Heat is applied directly to the retort, and the disengagement of free nitrogen begins at a temperature a few degrees below the boiling-point of water. It steadily but rapidly proceeds—the temperature generally rises a few degrees above the boiling-point, but after a little time again begins to fall. A gentle but constant heat will, however, keep up the disengagement of gas until the nitrite is all decomposed. It is desirable to slightly increase the heat towards the end of the reaction.

There is nothing specially new in this process, except the substitution of the sulphate for the chloride, and in the determining of the exact conditions under which the experiment may be carried on successfully for class illustrations, or for the purposes of procuring pure nitrogen with the least expenditure of trouble. If the reaction is pushed on very rapidly ammonia will be evolved, and this phenomenon is most marked when using the chloride in place of the sulphate. If carried on slowly with the sulphate no ammonia is evolved, but a trace of nitrogen dioxide is produced, which may be easily removed by washing with a dilute solution of permanganate of potassium. By carefully regulating the temperature almost pure and neutral nitrogen will be evolved.

* From the *Chemical News*.

TURPENTINE AND ITS PRODUCTS.*

BY EDWARD DAVIES, F.C.S., F.I.C.

In treating this subject it is necessary to limit it within comparatively narrow bounds, for bodies of the turpentine class are exceedingly numerous and not well understood. In this definite class turpentine means the exudation from various trees of the natural order Coniferæ, consisting of a hydrocarbon, $C_{10}H_{16}$, and a resin. The constitution of the hydrocarbons in turpentine from different sources, though identical chemically, varies physically, the boiling point ranging from 156° C. to 163° C., the density from ·855 to ·880, and the action on polarized light from −40·3 to +21·5. They are very unstable bodies in their molecular constitution, heat, sulphuric acid, and other reagents modifying their properties. The resins are also very variable bodies formed probably by oxidation of the hydrocarbons, and as this oxidation is more or less complete, mixtures are formed very difficult to separate and study.

Turpentine as met with in commerce is mainly derived from *Pinus maritima*, yielding French turpentine, and *Pinus australis*, furnishing most of the American turpentine. The latter is obtained from North and South Carolina, Georgia and Alabama. In Hanbury and Flückiger's Pharmacographia there is a full description of the manner in which the trees are wounded to obtain the turpentine. Besides these there are Venice turpentine from the larch, *Pinus Larix*, Strasbourg turpentine from *Abies pectinata*, and Canada balsam from *Pinus balsamea*.

The crude American turpentine is a viscid liquid of about the consistence of honey, but varying to a soft solid, known as gum, thus, according to the amount of exposure which it has undergone, it contains about 10 to 25 per cent. of "spirits," to which the name of turpentine is commonly given, the rest being resin, or as it is usually called rosin.

In Liverpool almost all the spirits of turpentine comes from America, so that it is almost impossible to get a sample of French.

The terpene from American turpentine is called austraterebenthene. It possesses dextro-rotatory polarization of +21·5. Its density is ·864. Boiling point 156° C.

In taking the boiling point of a commercial sample of spirits it is necessary to wait until the thermometer becomes steady. Not more than 5 per cent. should pass over before this takes place, and then there is not more than two or three degrees of rise until almost all is distilled over.

The liquids of lower boiling point do not appear to have been much studied. In French spirits they seem to be of the same composition as the main product, but with more action on polarized light.

* Read at a meeting of the Liverpool Chemists' Association.

*

French spirits of turpentine is mainly composed of terebenthene. The boiling point and sp. gr. is the same as those of austraterebenthene, but the polarization is left handed, and amounts to – 40·5.

Isomeric modifications. Heated to 300° C. in a sealed tube for two hours, it becomes an isomeric compound, boiling at 175° C., whilst the density is lowered, being only ·8586 at 0°C. The rotatory power is only —9°. It oxidizes much more rapidly. It is called isoterebenthene and has a smell of essential oil of lemons.

By the action of a small quantity of sulphuric acid among other products terebene is formed. It has the same boiling point and sp. gr. as terebenthene, but is without action on polarized light. Austraterebenthene forms similar if not identical bodies.

Polymers. One part of boron fluoride BF_3 instantly converts 160 parts of terebenthene into polymers boiling above 300° C., and optically inactive. H_2SO_4 does the same on heating and forms diterebene $C_{20}H_{32}$.

Terchloride of antimony does the same, and also produces tetraterebene $C_{40}H_{64}$, a solid brittle compound formed by the union of four molecules of $C_{10}H_{16}$. It does not boil below 350° C., and decomposes on heating.

Compound with H_2O. Terpin $C_{10}H_{18}2HO$ is formed when 1 volume of spirits of turpentine is mixed with 6 of nitric acid and 1 of alcohol, and exposed to air for some weeks. Crystals are formed which are pressed, decolorized by animal charcoal, and recrystallized from boiling water.

Compounds with HCl. When a slow current of HCl is passed through cooled spirits of turpentine, two isomeric compounds are formed, one solid, and one liquid. The lower the temperature is kept the more of the solid body is produced. To obtain the solid body pure it is pressed and recrystallized from ether or alcohol. It is volatile and has the odour of camphor. It is called artificial camphor, and has the composition $C_{10}H_{16}HCl$. There is also a compound with 2HCl.

Oxidation products. By passing air into spirits of turpentine oxygen is absorbed. It was thought at one time that ozone was produced, but Kingzett's view is that camphoric peroxide is formed $C_{10}H_{14}O_4$, and that in presence of water it decomposes into camphoric acid and H_2O_2. This liquid constitutes the disinfectant known as "sanitas," which possesses the advantages of a pleasant smell, and non-poisonous properties. $C_{10}H_{18}O_2$ may be obtained by exposing spirits of turpentine in a flask full of oxygen with a little water.

Camphor $C_{10}H_{16}O$ has been made in small quantity by oxidizing spirits of turpentine. Terebenthene belongs to the benzene or aromatic series, which can be shown from its connection with cymene. Cymene is methyl-propyl-benzene, and can be made from terpenes by removing two atoms of H. It has not yet been converted again into terpene, but the connection is sufficiently proved. The presence of CH_3 in terpenes is shown by their yielding chloroform when distilled with bleaching powder and water. The resin is imperfectly known. It was supposed to consist of picric and sylvic acids. It is also stated to contain abietic anhydride $C_{44}H_{62}O_4$, but it is difficult to understand how a compound containing C_{44} can be produced from $C_{10}H_{16}$. The most probable view is that it is the anhydride of sylvic acid, which is probably $C_{20}H_{30}O_2$.

The dark-coloured resin which is obtained when the turpentine is distilled without water can be converted into a transparent slightly yellow body by distillation with superheated steam. A small portion is decomposed, but the greater part distils unchanged. It is used in making soap which will lather with sea water.

When distilled alone various hydrocarbons, resin oil and resin pitch, are obtained.

I find that commercial spirits of turpentine varies in sp. gr. from ·865 to ·869 at 15° C. The higher sp. gr. appears to be connected with the presence of resinous bodies, the result of oxidation. The boiling point is very uniform, ranging from 155° C. to 157° C. at 760 mm. Taking these two points together, it is hardly possible to adulterate spirits of turpentine without detection. I give the figures for a few imitations or adulterations:—

	Sp. gr.	B.P.
No. 1	·821	137° C.
No. 2	·884	165° C.
No. 3	·815	150° C.
No. 4	·895	156° C.

There is a considerable difference in the flashing point, no doubt due to the longer or shorter exposure of the crude turpentine, by which more or less of the volatile portion escapes.

OXALIC FERMENTATION.

Herr W. Zopf records the discovery of a remarkable *Saccharomyces*, to which he gives the name *S. Hansenii*, in which the power of producing alcohol is replaced by that of producing oxalic acid. It was cultivated on beerwort gelatine and flesh-peptone gelatine, which it softened without liquefying. On beerwort, sugar solutions, mannite, etc., it produces a pellicle which is rapidly precipitated. Cultivated on a solid substratum it produces endogenous spores from 2 to 4 μ in diameter, usually only one, less often two, in each mother-cell. Scarcely a trace of alcohol could be detected in the fluids in which this microbe had been cultivated, while, on the other hand, crystals of calcium oxalate were formed, sometimes in very large quantities, in the same way as with other well-known producers of oxalic acid, such as *Penicillium* and *Sclerotinia*. The production of crystals of oxalate was obtained from the following carbohydrates, viz.:—Galactose, grape-sugar, cane-sugar, milk-sugar and maltose, also from dulcite, glycerine and mannite. It is possible that the further investigation of this interesting organism may throw light on the so common production of crystals of calcium oxalate in the form of raphides in plants.

A RECIPE FOR METHEGLIN.*

N.D.—"Take rosemary ij handfulls; ij kindes of tyme, ij handfulls; iij kindes of sage, of every kinde ij handfulls. Succory, jerope, fennell, lavander, margarum, jarmander, sparragus, bettony, myntes, camamell, of every one of these ij handfulls. Jarmander but one handfull. Penyriall, mayden-heare, hartestong, lyverworte, of eche of these half a handfull. Take to these xxj gallands of running water. First your water must be made so bigg with hony as it will beare an egg before it be boyled. Then must all these herbes be washed very faire and be swonge in a faire clothe and then wrong in peaces with your hands into the water, and so must boyle them, with ever skymming it, until the fourth part be wasted. Then clense your lyquor from the herbes and let it stand so all the night; and on the morrow cleare it fourth and putt some good ale barme to it, and sturre it every daie iij or iiij tymes as you would do ale, untill you feele it tast well of the ale barme, and then clense it upp into your barrell. That would be a quarter of a yere before it be ocapned (used).

Mem., that you put in as much Pinckly [*in another hand*, pinkely otherwayes called saxefrage] as the third parte of all the hearbes aforenamed."

* From the Report of the Historical Manuscripts Commission on the manuscripts of the Duke of Rutland.

The Pharmaceutical Journal.

SATURDAY, MAY 11, 1889.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE COUNCIL ELECTION.

ACTIVE participation in the work undertaken by the Council of the Pharmaceutical Society is not too frequently characteristic of members of the Society, and probably there is reason on that account to regret that the representative influence of the Society is sometimes less effective than it might be. But this year, on the occasion of the election of members of the Council, there is some deviation from the general rule. This has arisen from the intervention of the Society for the Protection of Animals from Vivisection, and as that intervention tends to bring about a serious interference with the work of the Society, it will not be out of place to refer to it in these columns for the purpose of more correctly informing the members of the Society as to its nature. Some weeks ago, as many of our readers will be aware, a circular was issued by the Secretary of the Society for the Protection of Animals from Vivisection, in which it was stated that the Committee of that body conceived the strange idea that the steps recently taken for the promotion of pharmaceutical research would involve "fruitless and confusing experiments on living animals." Although there was, in fact, absolutely nothing to justify such an assumption, the Committee of the body referred to has regarded it as a sufficient pretext for sending to members of the Pharmaceutical Society copies of its new pamphlet on "the futility of experiments with drugs on living animals." If the action of the Committee had extended no further than this there would perhaps have been no objection to raise beyond that which would be applicable in other cases where zeal for the propagation of particular opinions takes a somewhat aggressive form. But, on the basis of the groundless assumption above mentioned, the Committee appears to have been inspired with the idea that it was entitled to interfere in the internal affairs of a Society with which it has no concern, and with that purpose to take advantage of the annual election of members of Council to stir up dissension among the members of the Pharmaceutical Society and to instigate opposition to the election of certain candidates for election upon the Council. To that end members of the Society were requested to sign a printed statement of their disbelief in the utility of experiments with drugs on living animals, of their intention to vote only for candidates who are opposed to such experiments, and of their willingness to join a committee to oppose the policy of the old Council, and elect new members with different views.

At the time when that circular was issued we took occasion to designate it as a most unwarrantable proceeding, but we were of opinion that in other respects the absurdity of the assumption involved by it would have been too evident to admit of its receiving any serious attention. The result has, however, proved otherwise, if we may judge from the terms of a subsequent circular issued from the committee rooms of the Society for the Protection of Animals from Vivisection, which is headed "Election of Council of Pharmaceutical Society, 1889," and gives the names of twenty-eight members of the Pharmaceutical Society as constituting a committee to oppose the introduction of vivisection. In addition, a list is given of fourteen names of candidates for the Council election, and the Secretary to this Anti-Vivisection Society takes upon himself to request, and strongly advise, that they, and no others, shall be voted for. It does not appear whether this step has been taken by the direction, or with the authority, of the twenty-eight members of the Pharmaceutical Society who are represented as constituting the Committee to oppose the introduction of vivisection, nor is it clear why those members should have delegated to Mr. BENJAMIN BRYAN their power to influence the votes of their fellow members. But, if the circular has any meaning at all, it must be construed as indicating to those who are willing to be guided by it that the candidates for whom votes and interest are solicited have signified their approval of the proceeding and their sympathy with the objects of Mr. BRYAN. It must be inferred that the fourteen candidates named endorse the action taken, for on no other ground can the circular and the direction how to vote have any significance. But that is not really the case, and, as will be seen by the letters which appear in our correspondence columns, certainly eight of of the candidates for re-election upon the Council have never expressed their views on the subject one way or the other. So far, therefore, as they are concerned, the inducement to vote for them as supporters of Mr. BRYAN'S objects is given upon a false pretence. Moreover, if the letter from Mr. CROSS can be taken as indicating the extent to which the twenty-eight members of the Society whose names are made use of really know the views of the candidates recommended, the whole proceeding assumes, to say the least, a ridiculous character. This becomes still more evident when it is remembered that although Mr. BRYAN'S professed object

is to frustrate the work of the Research Committee of the Pharmaceutical Society, he recommends, with one exception, the re-election of all the members of the Council who are at this time, and have been throughout serving on that Committee. Moreover, one of the three candidates excluded from the list has not been a member of the Committee, and so far as he has shown any relation to research has been in opposition to what has been done. There is here an apparent want of *bona fides*, and it seems very natural that those who are thus recommended and made to figure as having given pledges in regard to vivisection should repudiate the action that has been taken, and declare their unwillingness to receive support on false pretences.

There are other particulars in which the untruthfulness of the circular issued by the Anti-Vivisection Society is manifest, as well as the statements in the journal published by that Society. Thus, for instance, it is stated that the "alliance" of Professor MICHAEL FOSTER and Dr. LAUDER BRUNTON with the Pharmaceutical Society "has followed" the refusal of the Council of the College of Surgeons to accede to their request for the establishment of a physiological laboratory, and the idea intended to be conveyed is obviously that they sought to carry out their project by means of the Pharmaceutical Society. But the fact is that neither of the gentlemen named can be said to have "joined" the Society, as is represented. Their "alliance" with the Society was not of their seeking, but the result of election as honorary members, quite apart from the matter of research that has been taken up, and so far as Professor FOSTER is concerned it took place six years before the application to the College of Surgeons, instead of following it, as stated in Mr. BRYAN'S circular. In the number of the *Zoophilist* for the 1st of April last are several paragraphs in which the work of the Pharmaceutical Society in promoting research is persistently misrepresented in a manner that can scarcely be ascribed to ignorance or stupidity. The Society's journal is stated to be in the habit of devoting "a considerable amount of its space to records of experiments on animals," and on the basis of this misrepresentation it is inferred that "before long we may expect to hear of all candidates for a chemist and druggist's diploma being compelled to go through a course of vivisection." Paragraphs of this kind may be useful in stimulating donations from sentimental or sensitive people, but such devices are unworthy of the supporters of a cause which claims to be humanitarian. We have nothing to say against the legitimate propagation of even sentimental views, still less against the endeavour to repress cruelty in any shape, but we do most emphatically protest against attempts to promote even those objects by means of specious pretexts, misrepresentation and interference with other peoples' affairs. Moreover, we feel sure that among the eminent persons whose names are put forward by the Society for the Protection of Animals from Vivisection as its patrons, such practices would not meet with approval as have been had recourse to in regard to the Council election of the Pharmaceutical Society and to the Laboratory which has lately been established for the promotion of research.

The approaching Annual General Meeting of the Society bids fair to be one by no means deficient in interest, if we may judge from the letters that have recently been published on several subjects that are likely to be brought under discussion on that occasion. There are also the two notices of motion, of which notice has been formally given, by Mr. Percy Wells and Mr. T. Nicholls, both of which relate to subjects of considerable interest and admit of wide differences of opinion. We shall not attempt to anticipate the views of members of the Society upon either of them, but would suggest that the prospect of such subjects being dealt with in a practical manner might in many cases be increased if they were beforehand dealt with by local associations or provincial bodies of chemists. To take the two notices of motion above referred to as illustrations of the need for such a mode of proceeding, it must be admitted that they cover wide fields in both cases, so much so that it could scarcely be expected they would be conclusively settled within the time at the disposal of the members attending the annual general meeting. The newly instituted staff of Divisional Secretaries in London and the Local Secretaries in the provinces might probably render good service by arranging for the preliminary discussion of such topics.

* * *

This year the Annual Dinner of the Members of the Society will take place on Tuesday next, the day preceding the annual meeting, at the Freemason's Tavern. There is every prospect of its being well attended, and as there will not be any Conversazione this year the gathering of members and their guests on Tuesday evening will be the only opportunity for conversation on the various topics which now interest pharmacists.

* * *

The idea that the Bill now before the House of Commons would, if passed, have the effect of subjecting apprentices to hardships of an unreasonable nature appears to be the ground of much of the opposition offered to it, and in regard to this view of the matter we have much pleasure in directing attention to the paper which appears on the subject in this number of the Journal. The experience of the student there referred to was in no way different from that of hundreds of others, with a single exception. Though under no unusually favourable conditions he appears to have realized at an early period the probable advantage to be derived from devoting attention to study, and acting upon that conviction made use of the opportunities presented to him of extending his technical knowledge. If that were the case with all apprentices it might be urged that there was no need of a Curriculum Bill. But the contrary is the case, and with the majority it is necessary to have a directly determining influence to induce them to apply their time to study while in the position of apprentices. If that condition were secured the demand for the services of mere crammers would probably be reduced, but at the same time the real interests of apprentices would be more adequately secured, and as Mr. Johnston shows the preparation for the examinations might go on while they are engaged in the ordinary routine of business.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

The monthly meeting of the Council was held on Wednesday, the 1st inst. Present:—The President, Mr. James E. Brunker, M.A., in the chair, the Vice-President (Mr. Draper), and Messrs. Merrin, Beggs, Wells, McCormack, Hayes, Hodgson, Allen, Simpson and Grindley.

A letter was read from Sir Spencer Wells and others stating that the International Congress of hygiene and statistics which was held at Vienna last year would be held in London in 1891, and inviting the Council to appoint two of its members to serve on a general committee intended to be formed for the purpose of organizing the Congress.

The Registrar was directed to reply to the letter stating that two members would be nominated in due course.

A letter was received from the Pharmaceutical Society of Great Britain returning thanks for a donation of the Society's Calendar of 1889.

The President reported that the House Committee met on the 6th of April, and having fully considered the financial position of the Society arrived at the conclusion that it would not be justified in recommending the Council, pending expected legislation, to involve itself in increased expense by removing to larger premises. It therefore recommended that arrangements should be made with the landlord of their present premises to remain there for another year.

The report was adopted.

On the motion of Mr. Allen, seconded by Mr. Hayes, the certificates of the successful candidates at the April examinations were ordered to be sealed.

The President stated that he had received a letter dated the 26th April from Messrs. Clay and Close, inquiring what were the intentions of the Council as regarded the introduction of a Pharmacy Bill in the present session. He had replied that at present the Council had not come to any decision. No communication had been received from the Chemists and Druggists' Association since the Council had declined to send representatives to Belfast to meet them in conference there. The only thing he had heard in connection with the matter was that it was very probable that the Belfast chemists would at once introduce a Bill containing the amendments that were adopted last year.

Mr. Wells: Would it not be well if a direction were given to Messrs. Clay and Close to watch that Bill for us. It might be brought in very quietly.

The President: The Council will be at a disadvantage if such a Bill be introduced by their opponents.

Mr. Wells said he thought this subject should be discussed in committee.

Mr. Allen said he was of the same opinion.

The Vice-President: I am of a different opinion.

The President said he also thought that the time had arrived for discussing the matter publicly now. At the last monthly meeting it was decided to invite the Chemists and Druggists' Association to a conference. The reply received to that invitation was, that it was utterly impossible for Sir James Hazlett to come to town, as his brother was dangerously ill, and suggesting that two representatives of the Dublin chemists and druggists and representatives from the Council should go down to Belfast, and take part in a conference to be held there. At a special meeting held that day week a majority of the Council decided that they would not send representatives to Belfast. That decision was communicated to the chemists and druggists of Belfast; and the whole question of a conference appeared for the present to have fallen to the ground. They had been given to understand that very possibly after a thorough discussion of the subject between the delegates from the different bodies an agreement might have been come to. That hope had been disappointed, and they had arrived at a dead lock.

Mr. Hayes: I think that as straightforward and honourable men we are not taking a straight course. We both want the same thing. The chemists and druggists want a Bill and we want a Bill. We have agreed to a large extent on the lines of the Bill.

Mr. Wells: No.

Mr. Hayes: Yes; we have to a large extent agreed on the lines that both require, and why we should not meet and discuss the matter with them as straightforward, honourable men I cannot understand.

Mr. Wells: As a matter of order, I wish to ask a question. At the last meeting the Council decided that they were not going to meet the chemists and druggists in Belfast. Is it competent to us to-day to pass a resolution saying that we will?

The President: There is no such question before the Council. What is before us now is the letter of Messrs. Clay and Close, asking what we are going to do.

Mr. Hayes: Our legal advisers have said that we ought not to withhold what we offered last year, for that if we should, the House of Commons would not sanction it.

Mr. Wells: Bear in mind that a majority of the Council did not give all that was given last year. The opponents got a great deal more last year than the Council would be prepared to give; and if it is a question of giving everything that they got last year you will not have the Council unanimous for a Bill this year.

Mr. Allen: I thought we had agreed to give them all that.

Mr. Wells: That was in the draft of the Bill last year! When?

Mr. Allen: Not at any one meeting, but at one meeting after another.

Mr. Wells: The President was empowered to go to London to make terms.

Mr. Hodgson: Is there anything to compel us to bring in a Bill now? The Bill which we did bring in is lapsed, and the Society is all the poorer. If these gentlemen bring in a Bill, what is there to prevent us, if they ask too much, from moulding it into a shape that would do us justice? As Mr. Hayes has remarked, we are pledged as honourable men to a certain line of action. If in their new Bill they should look for more than we arranged to give them, I suppose we would have power in the House of Commons to mould it into the shape that we originally agreed to.

The President: I may tell you that I have seen the Bill they propose to bring in, and it contains exactly the amendments that we agreed to before last Christmas. There are one or two points, however, as to which we might seek rather more favourable terms than it gives. Their Bill as drawn does not give sufficient power to impose an educational test upon those who are to be registered. That, however, is a point on which we may come to an agreement if we have a conference. With the exception of that point I, personally, am perfectly satisfied with the Bill drawn by the Belfast chemists. Every year the chance of our getting a Bill favourable to the interests of the Pharmaceutical Society will become less and less. Every year in a democratic House of Commons we will find a stronger set against anything in the nature of privilege. The House of Commons will certainly hold that this is a question affecting the privilege of an extremely small body of men who have only been in existence for the last fourteen years, and if our opponents make the strong case that they are now able to make, but did not attempt to make last year, they will be able to

satisfy the House of Commons that any opposition made by this Council to the Bill as amended is only a dog-in-the-manger opposition.

Mr. Wells: What benefits are this Council going to get?

The President: I will tell you. In the first place the condition of the law, which is at present very vague, would be settled. Next, the position of a number of men who at present have legal rights, but whom we cannot identify or get at, would be defined; and further, a number of persons would be placed in a legal position to carry on business in places where they are wanted. The Society would gain an income which it has not got at present; we would have a machinery for ascertaining who was and who was not breaking the law; and we would have other improvements in the law. For instance, we would be able to identify the proprietors of establishments, and to ensure that no establishment would be allowed to remain open unless it was managed by a qualified person. It is quite unnecessary to recapitulate all the provisions of the Bill which would place pharmacy in a position of security that it has not at present. The pharmacy law is at present in the vaguest possible position, with the exception of the point settled last year as to the right to dispense. You cannot prosecute for the sale of poisons in any part of the country without the certainty of failure.

Mr. Wells: I do not see how you can make that out. We have prosecuted successfully in several cases of breaking the law.

The President: Name them.

Mr. Wells: You had the Kells case and the Navan case. The only thing was that they did not go to the Queen's Bench for the law to be confirmed. Has there been a case of appeal in which a decision in our favour has been reversed? You brought the Ballybay case to the High Court, and you got a decision there.

The President: The simplest way to bring the matter to an issue, if you have the courage of your opinions, is to move that no steps be taken in the matter of legislation this year.

Mr. Wells: I have had the courage of my convictions pretty well all along and I am not afraid to stick to my convictions still; but we hear that we are going to get a lot, whereas the fact is that you are going to take the Society's rights away. They have the sole right of dispensing and the sole right of selling poisons, except in the case of certain persons whose rights are saved. Now you propose to break faith with your licentiates, and have a body of men who will take their places, so that it may not be possible for them to go to country towns and supply the wants that exist there, whereas the Society could go on, if it were let alone, and supply every town. We should not give away all the rights of our licentiates.

Mr. Simpson: Are the chemists and druggists going to bring in a Bill?

The President: They have their Bill ready.

Mr. Wells: They told us that they know they cannot succeed unless we go with them.

The Vice-President: The object of the last meeting was to see if there could be a *rapprochement* between us and the gentlemen in Belfast. The proposal made on that occasion was, fortunately or unfortunately, for the Society, negatived by a majority of 2. It seems to me that a final opportunity is given to the Council to come to a decision as to its future course on the basis of this letter of Messrs. Clay and Close, who say that if we propose to undertake legislation on our own behalf it should not be deferred. If we do not undertake legislation the Council should understand that it will be undertaken by the Belfast people on their own basis, and will not be so advantageous to us as if we effected some arrangement.

Mr. Hodgson: There are two courses open to us, either to go on with a Bill of our own and meet all the expenses of it, which will be heavy; or to wait until these gentlemen, the chemists and druggists, bring in their Bill, and see how far it agrees with the promises which have been already made; and, if it does not, to mould it into shape. I think you should be cautious how you go into legislation again on your own account.

Mr. Hayes: There is a third alternative. We have been invited by them to confer.

Mr. Wells: The majority of the Law Committee were in favour of having a conference, but they objected to going to Belfast. The action of the other day was to try and draw them up to Dublin. If they came up, every member would vote for receiving them and having a conference.

Mr. Hodgson: I think it very desirable that we should have a conference with these gentlemen in order to try to come to an amicable arrangement; but if I had been here the other day I would not have agreed to send a deputation of the Pharmaceutical Society down to Belfast.

Mr. Hayes: But Sir James Hazlett could not come up.

Mr. Wells: We had better wait until it is his convenience to come up and have a friendly conference; and then, if we can get what we want, agree to a Bill and go in jointly for it.

Mr. Hayes: Precisely. That would be the rational and sensible course to adopt. I do not think these gentlemen want to take any unhandsome advantage of us, and we do not want to take any unhandsome advantage of them.

Mr. Beggs: I think we should wait on Sir James Hazlett's convenience.

The President: I think any conference that took place, at which Sir James Hazlett was not present, would be certain to be a failure. He writes that he cannot possibly say when there will be a chance of his being able to come. Unless the Bill is introduced within the next fortnight there will be no chance of its being pushed in this session.

Mr. Grindley: There is no necessity for taking immediate action. I think it is much better for us to hold our hands. We are not prepared to incur the expense that we did last year, and by holding our hands we will improve our position.

Mr. Hodgson: I think so.

Mr. Grindley: There is no necessity for rushing into a thing which when it is got will be of very little value to us.

Mr. Simpson: We cannot concede more to them than we did last year.

The President: They do not ask it.

Mr. Simpson: I think we had better let it lie over for a little while.

Mr. Wells: If we are to get nothing and to let them get all that they were to get last year we should let them get their Bill and pay for it. If we are to have no voice in the matter, it would be a silly thing for us to give them our money for their benefit.

The President: There will be opposition on some points independent of the pharmaceutical chemists and the chemists and druggists. That opposition would be powerful enough against one lot of promoters, but it would be nowhere if the Bill were promoted in common by the Pharmaceutical Society and the chemists and druggists. If the two last mentioned bodies come to terms about the Bill it will be practically an unopposed measure. If not, and if the Bill should be brought in by the Belfast people, in order to give this Council a *locus standi*, we must petition against the Bill as opponents. We would have all the expense of opposing it, and the Bill would be thrown out as before, and nothing would be done. We cannot choose our own ground and our own time.

Mr. Simpson: Is it possible to get a copy of the Bill which they have drafted?

The President: I was only shown it in confidence.

Mr. Ferrall read the letters which had been exchanged relative to a deputation.

The President: They quite understand that the Council is ready to meet them in Dublin. The invitation in the first instance came from us.

Mr. Wells moved that the Council take no step at present in reference to Messrs. Clay and Close's letter of the 29th *in re* the Pharmacy Bill.

The President: I think that would close the door.

Mr. Hodgson: Add the words "until we have had a conference with the Chemists' and Druggists' Association."

Mr. Wells altered his motion as suggested.

Mr. Grindley seconded the motion.

Mr. Wells: We are willing to meet them but not seeking them. We are not going to run after them.

Mr. Allen moved—

"That the Council take no steps relative to Messrs. Clay and Close's letter until after the hoped-for conference with the Chemists' and Druggists' Association has been held."

Mr. Hayes seconded the motion.

Mr. Wells withdrew his motion, and that of Mr. Allen was put and unanimously carried.

The Council then adjourned.

[We understand that subsequently it was arranged that a conference should be held on Tuesday, the 7th inst., but up to the time of going to press we have received no information as to the result.—ED. P.J.]

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The fifth general meeting of the fortieth session was held at the Royal Institution on Thursday evening, April 25. The President, Mr. A. H. Samuel, F.C.S., in the chair.

The minutes of the last meeting were read and confirmed and the following donations announced:—The 36th Annual Report of the Committee of the Free Public Library, Museum and Walker Art Gallery, from the Committee; the Annual Announcement of the Ontario College of Pharmacy, 1889, from the College; the *Pharmaceutical Journal*, from the Society; *Canadian Pharmaceutical Journal*, from the publishers, and the *Pharmaceutical Record* of New York from the publishers.

A vote of thanks was accorded to the respective donors, and Mr. A. C. Abraham further explained the requirements of the Board of Trade respecting gelatine coated pills for ships' use.

There being no miscellaneous communications the President called upon Mr. T. Williams, F.C.S., to read a paper on—

The Sidney Gilchrist-Thomas Phosphate.

In complying, Mr. Williams gave a short biographical sketch of the inventor, and described the invention or discovery of the process by which almost any iron could be converted into steel, whereas previously about seven-eighths of the iron ore in Great Britain was quite useless for that purpose, on account of the phosphorus which it contained, and which was not removed by the ordinary Bessemer treatment. At first the converter was lined with bricks of silica, but the results were not altogether satisfactory; but now the lining consists of a mixture of lime and magnesia, a further quantity of lime being added during the operation. This removed all but a trace of phosphorus, a scum rising with the uncombined lime to the surface. This scum when ground to a fine powder constituted the article under notice, and was a valuable manure. An analysis showed that it contained about 40 per cent. phosphate of calcium, 30 per cent. free lime, and 8 to 9 per cent. sulphate of iron, with some other less important substances. Mr. Williams referred to experiments conducted and published by Mr. Griffiths on the use of sulphate of iron as a manure, and said his first opinion was that its effect was prejudicial to vegetable growth; subsequently, however, he found that it was not so when used alone, but when used with farmyard manure sulphuretted hydrogen was evolved, and resulted in serious injury to the crop. It was evident, therefore, that when properly used, the presence of sulphate of iron in this manure, which at first was considered undesirable, was not really so, and it may have some value along with the other constituents, which were of undoubted good.

The President said they were much indebted to Mr. Williams for his valuable paper, and for the trouble he had taken in bringing so many specimens for inspection, and he had much pleasure in proposing a vote of thanks to Mr. Williams.

This was seconded by Mr. A. C. Abraham, supported by Dr. Symes, Messrs. Barrett and Ward, and carried unanimously.

The meeting then terminated, the President announcing that the next general meeting will not be held until October.

LIVERPOOL PHARMACEUTICAL STUDENTS' SOCIETY.

A general evening meeting of this Society was held in the new rooms, Colquitt Chambers, 6, Colquitt Street, on Thursday, April 25, the President, Mr. H. B. Thornton, F.C.S., in the chair.

A paper was read on "Amateur Photography," by Mr. W. H. Jackson, who in the course of an excellent paper described the various parts of the camera, etc., the chemicals used and the reactions that take place. He also showed a number of landscapes in different stages of development taken during the Easter recess. A large number of views of the Suez Canal, the Pyramids and the Holy Land were kindly lent by one of the members.

Mr. H. Wyatt, Junr., also showed a number of lantern slides, and dwelt upon the advantages of hydroquinone as a developer, and described it as being superior to pyrogallic acid.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The ninth meeting of the eleventh session was held in the Pharmaceutical Society's House, 36, York Place, on the evening of Wednesday, March 20, at 9.15. Mr. George Coull, President, in the chair.

The minutes of last meeting having been read and adopted, Mr. Donald McEwen read a paper on "Ichthyol," giving a *résumé* of all the published information regarding it. Thereafter Mr. Alexander Findlay read a paper on the "Solubility of Chlorate of Potassium," showing that at 40° F. the solubility in water was only 1 in 26. He also showed that the presence of tincture of perchloride of iron materially increased the solubility, and that even in the cold chlorine was slowly liberated. The addition of glycerine was found to diminish the solubility. In a note on the solubility of boric acid he stated that he found the solubility rather less than that usually stated in text-books.

After discussion, votes of thanks were awarded to the authors on the motion of the Chairman.

The annual business meeting was held in the same place on the evening of Monday, April 29, at 9.15. Mr. George Coull, President, in the chair.

The minutes of last meeting having been read and confirmed, the Chairman called upon the Secretary to read the report of the Prize Committee on the "Ainslie" Pharmacy Prize Competition, from which it appeared that the first prize had been gained by Mr. George Shaw, 17, North Bridge, with 91 per cent. of marks; the second by Mr. Charles Baildon Thacker, 20, Queensferry Street, with 84·5 per cent.; and the third by Mr. Reginald E. Macdonald, with 62 per cent.

The President then presented the first prizeman with Lauder Brunton's "Materia Medica," Balfour Stewart's "Physics," and Huxley's "Physiology;" the second prizeman with Bentley's "Botany;" and the third prizeman with a copy of the "British Pharmacopœia," 1885.

The Treasurer read the financial statement, showing a balance of £1 6*s.* 4*d.*, as against £1 12*s.* 11*d.* last year.

The Secretary then read the annual report, which, though indicating a slight decrease in membership, was highly satisfactory.

On the motion of Mr. McCurrie, seconded by Mr. Lunan, the financial statement and report were unanimously adopted, and a vote of thanks awarded to the retiring office-bearers.

The botanical excursion arrangements were remitted to the Committee.

The following office-bearers were then elected:—President, A. Russell Bennett; Vice-President, D. McEwan; Secretary, J. G. Wilson, 24, Barony Street; Assistant Secretary, W. R. B. Dougall; Treasurer, J. H. Hoseason; and as members of Committee, Messrs. Baxter, Bell, Butchart, A. Findlay, J. Findlay, Lothian, McCurrie, and Macdonald.

The following were also elected members of the Prize Committee:—Messrs. Bod, Coull, and Duncan.

The meeting was then closed.

At a meeting of the General Committee the following botanical excursions were arranged to take place during the summer months:—

Date.	Place.	Meet at	Time.	Return.
May 15	Botanic Gardens	Garden Gate	6 a.m.	—
,, 29	Colinton Dell	Caledonian Stat.	8.40 p.m	By road.
June 12	Arthur's Seat and Duddingston Loch	Holyrood	6 a.m.	—
,, 26	Blackford Hill	Blackford Hill Station.	9 p m.	—
July 10	Craigcrook	Caledonian Stat.	5.50 a.m	8.6 a.m.
,, 31	Poet's Glen, Currie	,, ,,	6.20 a m.	8.3 a.m.

Mr. J. Findlay has kindly offered a copy of the British Pharmacopœia as a prize to the apprentice member who writes the best report on these excursions. The report must be handed in to the Secretary not later than October 1.

ABERDEEN AND NORTH OF SCOTLAND SOCIETY OF CHEMISTS AND DRUGGISTS.

The meeting which was arranged for 24th ult., was postponed till May 1. Fifteen members were present, and Mr. J. Johnston, the President, occupied the chair.

Before proceeding to the business of the meeting the Chairman said, "Allow me to thank you for the honour you have conferred on me by placing me in this position. I shall do my utmost to maintain the dignity of the chair, and with your assistance I hope I shall be able to do so as successfully during my term of office as has been done by my predecessors for the past fifty years; and also that all the business coming before our meetings will be conducted harmoniously and for the benefit of our Society. I may mention that this is not the first time I have had the honour of filling this chair. Thirty years ago I had the honour, and the dinner that year—at which I presided—was held in the Old Lemon Tree Hotel. Seven members—as far as I can remember—sat down to dinner. Five of these, I regret to say, have gone to swell the great majority, one has retired from business, and the other is your President for the year. Cutting prices were then unknown in the trade, and I should have been very glad indeed to have occupied this chair under the then existing style of doing business, viz., the principle of live and let live, charging fair prices, leaving a margin of profit for capital invested, and remuneration for our labour."

An intimation was made to the meeting that Mr. Coutts declined, on account of his late serious illness, to accept of the post of Librarian. The members present expressed their regret at losing the services of such an efficient and painstaking Librarian as Mr. Coutts had proved himself to be through a long series of years, and in accepting his resignation they express the hope that he may soon be restored to perfect health and be able to interest himself in the welfare of the Society of which he has been so long an honoured and respected member, and they instruct the Secretary to send an excerpt of this minute to him.

Mr. John Cruickshank was then elected Librarian.

The Secretary reported the names of those who had not joined the Society for the current year, and Messrs. Johnston, Kay, J. Paterson, Giles, G. J. Shepherd, and G. P. Cruickshank were appointed a deputation to wait on them, and show reason why they should become members.

The members then discussed what form the annual outing should take. After a general expression of opinion it was resolved that it take the form of a picnic, and that ladies be present, the place recommended being Paradise, and the most suitable dates, June 12 or 26 and July 3. The whole matter was put in the hands of the standing committee on entertainments, to submit a detailed report to next meeting, which was arranged for 29th inst. at 8 p.m.

Dr. Presslie and Mr. J. Cruickshank then reported the financial result of the entertainment to the assistants and apprentices in the Music Hall Buildings on March 5, and the meeting separated.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting of the Chemists' Assistants' Association, held on Thursday, March 21, a paper was read on—

The Microscope in its Application to Pharmacy.

BY E. RICHARDS, F.I.C., AND F. A. ROGERS, PH.C.

The paper, which was illustrated by a large number of microscopical slides exhibited by means of a micro-lantern kindly lent by Messrs. How and Co., was divided into three parts, the first being introductory and containing the acknowledgments of the authors to several gentlemen for help rendered them in preparing and illustrating the paper.

The second part of the paper related specially to the examination of some of the aconites and their alkaloids. In the first place several sections were shown of English *Aconitum Napellus* roots obtained from the

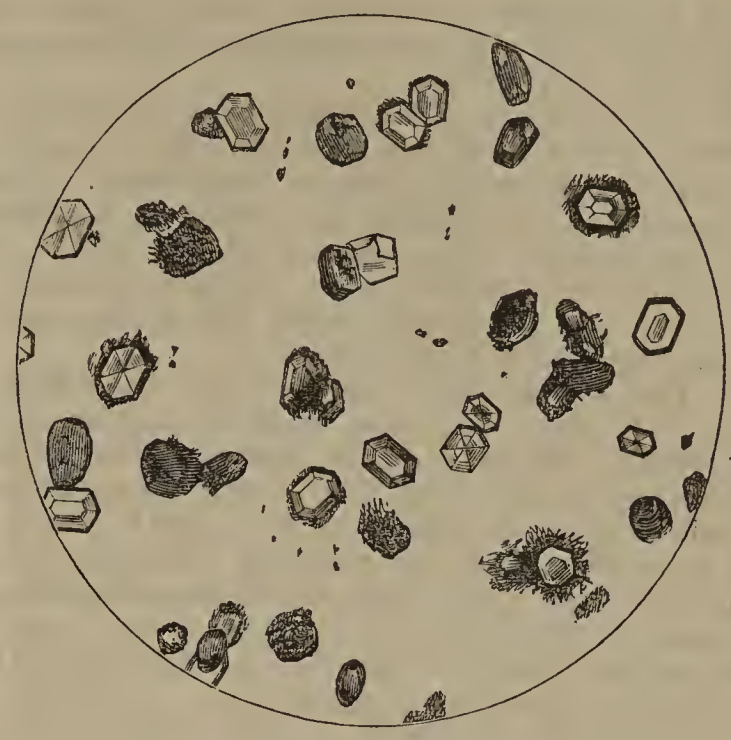
Royal Gardens, Kew, and the garden of the Apothecaries' Society at Chelsea, as well as from Hitchin and the neighbourhood of Sevenoaks. From a study of these sections and others not shown the authors would describe the English-grown *A. Napellus* root as follows:—"A brown-walled periderm, next to which comes a layer composed of about twelve rows of muriform parenchymatous tissue, containing yellowish stone cells sparingly interspersed. The next zone, which extends to the cambium layer, consists of loose parenchymatous tissue, in the inner half of which the tissue of the medullary and bast rays is seen, with a dotted appearance caused by the sieve bundles. A narrow cambium layer comes next, enclosing a large-celled pith in the angles of the cambium layer pushed outwards. At from four points in the tip to seven points near the crown of the root are the fibro-vascular bundles, the average number of which is six in a mature root, forming with the cambium layer a figure varying from an almost perfect hexagon to a star."

The next series of slides similarly illustrated the German *Aconitum Napellus* root, and this the authors described as follows:—"A brown-walled periderm, next to which comes a ring composed of about fifteen rows consisting of tangential stretched dotted cells. It contains yellowish stone cells sparingly interspersed. The middle ring is separated from the inner by a kind of kernel sheath, consisting outwards of tangential stretched parenchyma cells, further inwards changing into the tissue of the medullary and bast rays. The pith (rather large-celled) is enclosed by a cambium layer of many rows. Five to seven vascular bundles lying in the points of the five to seven ray-like distended pith form the woody portion. The individual bundles, one to three rows of retiform in a thin-walled ground tissue."

The adulterants and substitutes of *A. Napellus* root were then spoken of, reference being made first to the admixture observed some years since by Mr. Holmes, of the aromatic root of *Imperatoria Ostruthium*, L., sections of which were shown and described. The only other substitute illustrated was Japanese aconite root, and it was pointed out that the external appearance of this root was itself distinctive. The sections showed an arrangement of the fibro-vascular bundles different from that occurring in *A. Napellus* root; they were also more numerous than in the latter, and there was only one zone outside the cambium layer, whilst in the German and English *A. Napellus* roots there are two zones.

The authors next dealt with the interesting subject of the situation of the aconitine in the root. In a slide showing a section of the fresh root touched with Mayer's solution, a coloration varying from a yellow to dark brown was seen to have taken place in the cambium layer and fibro-vascular bundles, and also to a less extent in the sieve bundles, the other portions of the root remaining unaffected. In another section that had been touched with a solution of phosphomolybdate of soda, a coloration varying from a light to a dark blue was apparent in exactly the same portions of the root as were affected by the Mayer's solution, the remaining portions, as before, being unchanged. From these results the authors are disposed to believe that aconitine only exists in the root in the fibro-vascular bundles, cambium layer and sieve bundles.

A number of slides were then shown, illustrating crystallizations from alcohol and ether of the aconitines from the aconites shown. The authors stated their opinion that the best test for true nap-aconitine is to be found in the appearance of the characteristic crystal under the microscope, which invariably shows it as a hexahedral flat prism with pointed ends. This form of crystal, which they had failed to obtain from either Japanese aconite or *Aconitum ferox* roots, is shown in the following figure:—



Jap-aconitine, obtained by extracting Japanese aconite root with ether and crystallizing the alkaloid from alcohol, was shown as a long columnal crystal, almost a parallelogram, which could not be mistaken for nap-aconitine. Some aconitine from *Aconitum ferox* obtained through a drug broker, showed no crystalline structure at all. Another interesting point that was illustrated was the apparent action of nitric acid upon aconitine. Aconitine nitrate, crystallized from alcohol, appeared in prismatic crystals radiating from a centre, with no very characteristic shape, and nap-aconitine, recovered from the nitrate and crystallized from alcohol, no longer showed a characteristic form of crystal. It was considered that this was confirmatory evidence of the lesser utility of the aconitine nitrate. The authors also mentioned that they had failed to obtain any crystals from amorphous aconitine, B.P., commercial amorphous aconitine or sulphate of aconitine, and they questioned their value being equal to that of crystallized aconitine. It was further mentioned that a number of slides had been received from Mr. T. B. Groves, an examination of which had appeared to confirm the authors' experience in the practical study of aconitines, that nap-aconitine obtained direct from the root could always be distinguished from any other by its characteristic shape, and that the apparent action of nitric acid upon the alkaloid cast a doubt upon the medicinal value of the nitrate.

The third section was limited to illustrating the advantage afforded by the microscopical examination of sarsaparilla root, and of the natural and artificial salicylic acid and salicylates. With respect to the latter it was stated that a striking difference had always been observed in the microscopical appearance of the natural and artificial products, and that the unmistakable appearance of the crystals of "cresyl-salicylic acid" obtained from the artificial acid and salts would be of value in testing those compounds.

At the conclusion of the paper,—

The President said the Association was deeply indebted to the authors for such a valuable and interesting paper. He had been much struck with the great difference between the appearance of the crystals of aconitine and its nitrate, and it certainly seemed to him possible, as the author suggested, that the oxidizing action of nitric acid might in some way modify the action of the alkaloid.

Mr. W. Martindale said he should like to know if the authors of the paper had consulted any authorities as to the alleged difference in the action of aconitine and its nitrate. Salts that were very different as to the appearance of their crystals were still equally

active, and though the oxidizing action of nitric acid might modify the action of aconitine, it did not necessarily render it inactive.

Mr. A. H. Mason said he should like to endorse the remarks of the President as to the highly creditable nature of the paper they had just listened to. It was perhaps just a little crude, but still very instructive and interesting. The question of the action and appearance of aconitine was a much vexed and disputed one, and he congratulated the authors on the way in which they had treated it.

Mr. F. C. J. Bird said that this paper was a striking instance of the great value of the microscope to the pharmacist. He was much interested in the different appearance of the crystals of the natural and artificial salicylic acid and salicylate of soda, and it seemed to him to confirm the view (held by many physicians) that there was a chemical difference between them. He congratulated the authors on their very beautiful sections, and should like to ask for information as to the details of their manufacture.

Mr. T. A. Ellwood said he hoped before long that the microscope would be regarded by pharmacists as an indispensable adjunct in the conduct of their business. Its value in indicating the best methods of extraction, by showing where the active principle lay, was enormous. As to the slides of crystals exhibited, it was a question whether the shape of the crystals did not often depend upon the process used for extraction. With regard to the nitrate of aconitine it did not seem to him that the shape of the crystals had to be regarded as indicative of modified action, although of course nitric acid had a marked effect upon alkaloids. The crystals of salicylate of soda (artificial) exhibited seemed to him singularly poor, but perhaps a bad sample had been chosen expressly to emphasize the difference between it and the crystals of the natural salt. Some time ago, an extremely long and elaborate paper had been read before the Chemical Society, in which the author seemed to prove the chemical identity of the natural and artificial salicylates, and in the same paper the physiological effect was shown to be apparently exactly the same, and he thought the crystals of salicylate of soda, natural and artificial, shown by Messrs. Richards and Rogers, were phenomenally good and bad. He hoped that this would be but the first of a series of papers on the application of the microscope to pharmacy.

Mr. Robins said that in recently analysing a mixture containing natural salicylic acid he had extracted some of that acid with ether, which gave crystals much like star-anise in appearance, and with Kolbe's acid he had got the same result.

Mr. W. L. Williams said that he considered that crystalline form was to be taken as an evidence of purity only to a very limited extent, for impurities frequently crystallized with the substance. He would like to endorse Mr. Martindale's remarks as to the absence of evidence on the mitigated action of aconitine nitrate; he had heard (he could not say from what source) that it was more powerful than the alkaloid itself. With reference to the section of yellow sarsaparilla shown, he might mention that in some parts of England this variety was preferred to the Jamaica.

At the request of the President—

Mr. Cole stated that the sections shown were prepared in the following way:—The roots were first hardened by soaking in spirit, then embedded in carrot and sections cut, placed in acid green solution, washed with water, then placed in borax carmine, washed in spirit, cleared in turpentine, and mounted in Canada balsam.

Mr. Richards replying to the questions raised, said, in reply to Mr. Martindale, that he had not consulted many authorities upon the mitigated action of aconitine nitrate and aconitine recovered from the nitrate, so very little was known on the subject, but from experiments tried upon himself with almost disastrous results, he believed the action of nitric acid deteriorated the medicinal value of the alkaloid. In reply to Mr. W. L. Williams, as the results of experiments, he considered that the crystalline form was the purest attainable, especially as regards alkaloids and from microscopical work. In reply to Mr. Ellwood, the salicylates distinctly showed a great difference in crystallization under the microscope. Some time ago Mr. Ellwood called his attention to an article which appeared in the *Chemical News* in reference to the salicylates, but in his experience they were totally different, as shown in the slides, nor could he agree that the physiological action was the same. Medical authorities differed on this point.

Mr. Rogers, in reference to questions raised, said that Mr. Cole, being fortunately present, had, as was most suitable, given the process to-night as practised by him so successfully, and that any skill he (Mr. Rogers) might have in the preparation of drug sections was due to Mr. Cole's careful training. He drew the attention of members to the microtome and apparatus used by him in the preparation of sections; and to the living plants of *Aconitum Napellus* on the table.

A vote of thanks was accorded to the authors for their valuable and instructive paper, and to Mr. Carnal for his skilful management of the micro-lantern.

The Annual Meeting.

The Annual General Meeting of this Association was held at 103, Great Russell Street, on Thursday, May 2, Mr. E. J. Millard, President, in the chair. The minutes of the previous meeting having been read and confirmed, the President called on the successful author of the Association Prize Essay, Mr. T. Fawssett, to read his essay, of which the following is a brief abstract:—

The Use of Bromine for the Estimation of the Cinchona Alkaloids.

BY T. FAWSSETT.

The observation that a solution of sulphate of quinine required considerably more bromine water to produce in it a permanent yellow tint than a similar solution of sulphate of cinchonidine suggested the employment of this reaction as a means for estimating the cinchona alkaloids.

The investigations of Laurent, Anderson, Cahours and Etard, Bloxam, Jackson and Eiloart have shown:—(1) that bromine is capable of combining with alkaloids to form bromo-derivatives; (2) that the alkaloids differ in the amount of bromine with which they can combine; (3) that the amount of bromine absorbed depends on the physical conditions (temperature, solution, etc.) of the substances.

With a view to ensuring the constancy of these conditions the following process has been devised:—1 gram of the alkaloid or alkaloidal salt is dissolved in just sufficient dilute sulphuric acid, and the solution is diluted with water to 600 cubic centimetres in a cylindrical vessel. The temperature of the solution must not be much below 60° F. It is now titrated with bromine water contained in a burette provided with a well fitting float, the first 10 c.c. of which has immediately before been estimated in the usual way. The bromine water is run in in quantities of 5 c.c. (the colour being allowed to disappear after each addition), until a permanent yellow tint is produced. The excess of bromine is estimated colorimetrically, by running the bromine water into a vessel of the same dimensions and containing an equal quantity of pure water till an identical tint is obtained. From this the actual amount of bromine decolorized by the alkaloid is readily calculated.

A series of experiments were made with the object of ascertaining the number of atoms of bromine

absorbed by a molecule of each alkaloid. It was found that a molecule of quinine, quinidine and cupreine each absorbed approximately six atoms of bromine, hydroquinine four atoms, and cinchonidine, cinchonine and amorphous quinine each two atoms. The figures obtained were only approximately correct, commercial alkaloids having been employed. In order to confirm the results with pure alkaloids, the quinine and cinchonidine were submitted to processes for purification, and it was then found that their bromine absorption equivalents exactly corresponded with those given above. A correction was made for the impurities found in the hydroquinine, with the result that the bromine absorption equivalent of that alkaloid was also considered to be correct.

The behaviour of bromine water on mixtures of quinine and cinchonidine, and of quinine and hydroquinine was next observed. It was found that the bromine absorption equivalent of the mixture was the sum of the bromine absorption equivalents of the constituents. It is therefore possible to estimate the amount of an impurity in an alkaloid by this process, at any rate when the quantity of the impurity is not very minute. It was found that the double compound of quinine and cinchonidine described by Kerner and Weller as "latent cinchonidine" has a different bromine absorption equivalent from a mixture of the alkaloids. It is therefore necessary, in estimating by this process quinine or cinchonidine containing the double compound, to decompose it by heating previously to 248° F.

A specimen of commercial sulphate of quinine was now completely analysed, the bromine absorption equivalent being estimated at each stage of the operation. It was found that after drying, after removing the cinchonidine, and after removing the hydroquinine, the alkaloid required precisely the amount of bromine, that quinine, in these various degrees of purity, was calculated to require. When, however, an impure quinine sulphate of a similar composition was artificially prepared, the bromine absorption equivalent was found to be lower than that given by the original specimen. This was probably due to the cinchonidine in the latter being in the form of the double compound. A number of essential experiments showed that the process gives constant results, the maximum error when 1 gram of alkaloid is used being ·008 gram of bromine.

Specimens of English, French, German and Italian quinine were estimated by the process, with the result that 1·029 grams of bromine was found to be the average absorption equivalent of 1 gram of commercial sulphate of quinine.

If the usual qualitative tests for impurities be first applied and the water be removed, and the double compound of quinine and cinchonidine decomposed by heating to 248° F., the author considers that the process gives a ready and reliable means of estimating the value of commercial sulphate of quinine.

The President, with a few graceful words, then presented to Mr. T. Fawssett the Association Silver Medal, together with a prize of £5 and a copy of Remington's 'Practice of Pharmacy,' these two latter prizes being generously given by Messrs. Burroughs, Wellcome and Co.

The Honorary Secretary then read

The Annual Report.

The Council has a very pleasing duty to perform in presenting the Twelfth Annual Report. The Association numbers 171 members, of whom 66 have been enrolled during the session, showing an increase of 22 in the strength of the Association. There are 43 Patrons, an increase of 8. The average attendance has again been satisfactory, being considerably greater than in any previous year. The use of a larger room for the meetings has been permanently acquired, but even this was too small for the purpose of Dr. Macnaughten Jones's lectures, and the Hanover Rooms were specially engaged. Twenty-one papers have been read, an exceptionally large number having been given by members (an eminently favourable feature). A discussion on "Trade Protection" has also taken place, whilst the two meetings set apart for the reading of notes and short papers have been successful. The Conversazione at the Portman Rooms on November 15, and the Annual Dinner at the Holborn Restaurant, presided over by G. F. Schacht, Esq., F.C.S., on February 28, were both highly successful and more numerously attended. The Silver Medal of the Association and the prize of £5, together with a copy of Remington's 'Practice of Pharmacy,' generously given by Messrs. Burroughs, Wellcome and Co., have been awarded to Mr. T. Fawssett for an essay entitled, "On the Use of Bromine Water in Estimating the Cinchona Alkaloids." The accompanying balance sheet shows the financial soundness of the Association. The Council, in conclusion, has to congratulate the Association on the steady and persevering progress of the session.

The adoption of the report having been moved by the President, and seconded by the Vice-President, Mr. T. A. Ellwood, was, after a few comments by the President, carried unanimously.

The following balance sheet was then read by the Honorary Treasurer, Mr. C. J. Strother:—

Receipts.

	£	s.	d.
Balance from Session 1887-8	31	7	1
Grant to Publishing Fund	25	0	0
Subscriptions—			
171 members'	42	15	0
43 patrons'	21	10	6
Balance from Dinner	6	9	8
Publication of reports, etc.	11	18	0
Donations—			
The Vice-President Pharmaceutical Society	1	1	0
T. Greenish, Esq.	1	1	0
Professor Attfield	0	10	6
N. H. Martin, Esq.	0	10	6
W. A. H. Naylor, Esq.	0	5	0
Messrs. Allen and Hanburys	1	1	0
G. Atkinson and Co.	1	1	0
Baiss, Bros. and Co.	0	10	6
Barclay and Sons	1	1	0
Barron, Harveys and Co.	1	1	0
Bourne, Johnson and Latimer	0	10	0
Davy, Yates and Routledge	1	1	0
Edwards and Son	1	1	0
Evans, Lescher and Webb	1	1	0
Ford and Shapland	0	10	6
D. and W. Gibbs	0	10	6
Hearon, Squire and Francis	1	1	0
Hill and Sons	1	1	0
Hockin, Wilson and Co.	1	1	0
Hodgkinson, Prestons and King	1	1	0
Hodgkinsons, Treacher and Clarke	1	1	0
Horner and Son	1	1	0
Maw, Son and Thompson	1	1	0
Meggeson and Co.	1	1	0
Morson and Son	1	1	0
Sanger and Sons	1	1	0
Savory and Moore	2	2	0
Seabury and Johnson	1	1	0
Silverlock, Mr. H.	1	1	0
Smith and Co.	1	1	0
Toogood and Son	1	1	0
Wright, Layman and Umney	1	1	0
Rent of Piano	5	0	0
Sale of 'Proceedings'	0	16	6
Advertisements	3	3	0
Stamps, etc., in hand	0	6	0
	178	19	3

Expenditure.

	£	s.	d.
Rent	26	10	0
'Proceedings'	42	15	6
Stationery and Printing	11	4	6
Stamps	6	18	3½
Postal wrappers	2	17	4½
Printed post cards	10	1	6
Refreshments	6	5	0
Conversazione	13	4	8

	£	s.	d.
Pianist	1	2	6
Lime light for lecture	1	18	6
Piano	5	10	0
Sundries	0	10	1
Medal	0	18	0
Grant to Publishing Fund	20	0	0
Balance in hand	29	8	4
	178	19	3

The adoption of the balance sheet having been moved by the President, and seconded by the Vice-President, Mr. F. Ashley Rogers, was carried unanimously.

The following amendment to Rule 3 was then proposed from the chair, seconded by Mr. F. Ashley Rogers, and after some remarks by Mr. Blackburn, carried unanimously:—After the words "Honorary Secretaries," "The Council shall have power to elect as honorary vice-presidents any members who have passed the chair."

The Secretaries then delivered the following report as the result of the election for the new Council:—

Council Election, 1889.

Number of voting papers received	71
Informal	1
	70

Philp, W. J., 69; Rogers, F. Ashley, 69; Ellwood, T. A., 68; Millard, E. J., 67; Strother, C. J., 67; Stark, A. C., 63; Layman, E., 62; Fawssett, T., 61; Rogers, Frank A., 59; Richards, E., 52; Wyatt, W., 47; Williams, W. Ll., 45; Taylor, E. S., 43; Davis, F., 35; the above form the Council. Everson, H. C., 28; Morris, W. A., 27; Duckett, F. W., 25. Messrs. Moss and Rowlands, withdrawn.

(Signed) { Jno. C. Fell. / G. Sidney Pasco.

A vote of thanks having been accorded to the Secretaries for their services, the President delivered the following valedictory address:—

Valedictory Address.

Gentlemen,—It is now my duty to surrender the charge committed to me at the commencement of the session.

When your Executive did me the honour of electing me as your President, I heartily wished that the mantle might have fallen upon worthier shoulders. As a duty, I accepted the task, and it has been made a lighter and more pleasing one by the feeling that the Association has made satisfactory and substantial progress during the year.

Where all have worked well it is invidious to particularize, but much of this progress is due to the indefatigable energy of the officers of the Association, who have so freely devoted themselves to the work.

In taking a retrospective glance at what I will call the lessons of the session, I am gratified at seeing so large an influx in the number of papers contributed by our own members. In my inaugural address I laid special stress upon the importance of every member taking a share in this work, and I cannot but regard the result as a healthy proof of the vigour and vitality of our organization. Members are, I am glad to say, beginning to realise that each one is a walking coal mine, and that he has but himself to choose whether he will bring forth heat and light, or only smoke.

On the other hand, I would urge you to consider it a duty to support your own fellow members by your presence when they are reading papers before the Association. It is only natural that masters of the art of pharmacy and the kindred sciences should attract a larger audience than the more humble student, but I would remind you that mutual pleasure and profit are both derived and given by supporting one of our own class.

We have still to regret the apathy of the bulk of pharmacists to scientific progress. In fact, our charge against the majority is that their appreciation of scientific work, as science, is dull, is blunt, is superficial, that many of them have no adequate perception of the place of science as an element of their future universal advancement or of further public recognition.

Considering that the primary object of the founders of this Association was the promotion of intercourse amongst junior pharmacists, whilst the discussion of pharmaceutical subjects was placed secondary, I cannot help thinking that we are still far from the goal of their ambition. We must not forget that if we have little leisure, many assistants have still less. If we are tired after the day's work, others are more so. Many of those whom we are anxious to enrol as members of this Society are not struggling geniuses thirsting solely for intellectual reaction. They have not the strong ambition, the natural habit, nor, perhaps, the physical capacity to concentrate their attention upon things scientific, or upon mental study after nine, ten, or twelve hours of hard and confining work.

The principal suggested method of increasing the sphere of the Association's usefulness by the formation of a club has my heartiest support, for I believe by that means we should reach and benefit a large body of our fellow assistants still untouched. But your Council cannot well move in this direction until they are unmistakably assured that it would supply a long-felt want and be a real boon to the younger chemists of the metropolis, They will, I am sure, consider the matter practically when there is some sign of general and not isolated enthusiasm on the subject. Matters of detail, as to whether membership of the Association should constitute membership of the club, could be settled later on. But if there is any genuine and decided feeling upon the subject, I am confident your new Council could not pass it over. It would, I believe, be far reaching in its beneficial effects upon the members of our fraternity, it would give them those social conveniences and privileges from which, by the very nature of their employment, they are so much debarred, and would offer that intelligent relaxation which they so much need.

I am not prepared to say that this is the only right way or the very best way of extending our work amongst chemists' assistants, but whilst we are discussing methods valuable opportunities are being lost. If the project should fail, although I do not believe it would fail, it would only show that the best intentions do not always ripen into satisfactory fruition. But, if we are to do nothing until there is no difference of opinion and no conceivable objection, when shall we do anything? We had better make some mistakes in a right direction than take refuge in idleness or indifference.

I am glad to take this opportunity of recognizing the opinions which have been expressed upon us during the session by the Presidents of two provincial associations. A high compliment was paid to this association by Mr. J. G. F. Richardson, Member of the Council of the Pharmaceutical Society and President of the Leicester Chemists' Association, and a still higher by Mr. G. E. Perry, President of the Midland Counties Chemists' Association, who admitted that his Society could hardly vie with us, as we had youth and ambition on our side. We proudly admit the soft impeachment, and who will blame us if we prefer to leave behind us some tiny footprints in the sands of time to show where we have been.

With the whole body of pharmacists we deeply deplore the irreparable loss sustained by pharmacy in the decease of one of our deceased patrons, John Williams. It is a melancholy satisfaction to find that hardly a year ago he wrote to one of our secretaries saying that he regretted that by the rules of the Association he

could not become an ordinary member, as he took a deep interest in our proceedings.

In conclusion, I would reiterate that this Association by its steady progress has justified its existence; but if we are still to continue a mutually elevating and stimulating body, with keen aspirations for the welfare and happiness of chemists' assistants, we must kindle fresh enthusiasm, inspiration, *esprit-de-corps* and public esteem by new energy and effort.

Mr. T. S. Dymond then proposed, and Mr. H. H. Millhouse seconded, a hearty vote of thanks to Mr. Millard for his able presidency, which was carried by acclamation.

The President, in reply, thanked the members for the support shown him during the session, and gratefully acknowledged the services of the honorary secretaries, Messrs. Philp and Stark, and the other officers of the Association.

The proceedings then terminated.

CHEMICAL SOCIETY.

A meeting of the Chemical Society was held on Thursday, April 18, 1889. Mr. W. Crookes, F.R.S., Vice-President, in the chair, when a number of certificates were read for the first time and the following papers were read:—

Sawarri Fat. By J. Lewkowitsch, Ph.D.—Sawarri nuts contain 63 per cent. of a white solid fat, of which the author has determined the physical constants. The density is 0·8981 at 40° C. relatively to that of water at 15° C.; the melting point lies between 29·5° C. and 35·5° C.; the solidifying point at from 23·3° to 29° C. The acids from the fat melt at 48·3° C. to 50° C. and solidify at 47–46° C.

	Per cent.
Saponification value (Köttstorffer) .	199·51
Insoluble acids (Hehner's value) . .	96·91
Glycerol determined by the acetin method	9·14
Free acids	2·4
Mean molecular weight of the acids .	272·8
Soluble acids (Reichert's value) . .	0·65
Iodine value of the fat (v. Hübl) . .	49·5
Iodine value of the acids	51·5
Acetyl value (Benedikt)	77·5
Iodine value of the acetylised fatty acids	51·8

The author intends to examine the acids in the manner indicated by Hazura.

Note on β-Phenylnaphthalene. By Watson Smith.

Nitro- β-Chloronaphthalene. By Henry E. Armstrong and W. P. Wynne.

The Action of Halogens on Betanaphthol. By Henry E. Armstrong and E. C. Rossiter.

β-Methoxynaphthalenesulphonic Acids. By J. Percival, B.A.

The Acids formed by displacing NH_2 *in Brönner's Betanaphthylaminesulphonic Acid by Halogens.* By W. Houlding, B.Sc.

Obituary.

FREDERICK BARRON.

Reference has already been made in this Journal to the death on the 30th ult. of Mr. Frederick Barron, and the resolution of regret and sympathy that was passed by the Council of the Pharmaceutical Society immediately after the reception of the news was a suitable expression of the feeling with which the loss will be regarded by all to whom the deceased was known. Mr. Barron began his connection with pharmacy early in life by serving an apprenticeship with a chemist and druggist at Bromley, in Kent. He then became a partner in the firm of Barron, Harvey and Co., Giltspur Street, of which his father had been one of the founders. About thirty years since he withdrew from that house and joined the firm of Drew, Heyward and Co., in which, now known under its altered title of Barron, Squire and Co., he eventually became the senior partner. In the business of each firm successively he took an active part and made many friends whilst on his journeys. On 'change, which he attended until quite recently, he was greatly esteemed, and his death evoked an honourable tribute of regret from those who had been in the habit of meeting him there for so many years. Mr. Barron became a member of the Pharmaceutical Society in 1853, and for many years acted as one of its auditors. The Benevolent Fund has been on several occasions the object of his benefaction, and his donations amounted together to a very large sum. Mr. Barron was in his eightieth year and the immediate cause of his death was pleurisy.

Notice has also been received of the death of the following:—

On the 25th of February, Mr. Thomas Marsden, Chemist and Druggist, Anchor Court, Preston. Aged 54 years.

On the 2nd of March, Mr. Thomas Welch, Chemist and Druggist, late of Pennistone. Aged 67 years.

On the 23rd of April, Mr. John Bradshaw, Chemist and Druggist, Adlington, Lancs. Aged 37 years.

On the 25th of April, Mr. James John Sutherland, Chemist and Druggist, Leith. Aged 44 years.

On the 28th of April, Mr. Henry John Parker, Chemist and Druggist, Blaydon-on-Tyne. Aged 66 years.

On the 28th of April, Mr. Richard Richardson, Chemist and Druggist, George Street, Portman Square, London. Aged 57 years. Mr. Richardson was an Associate in Business of the Pharmaceutical Society.

On the 2nd of May, Mr. Walter Robert Gwillim, Pharmaceutical Chemist, Llanthoney, Abergavenny. Aged 23 years.

On the 3rd of May, Mr. Francis Ward, Pharmaceutical Chemist, Lower Grosvenor Place, London. Aged 70 years. Mr. Ward, who had been in business in Belgravia upwards of forty years, had been a Member of the Pharmaceutical Society since 1845.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Interference of the Anti-Vivisection Society with the Council Election.

Sir,—I have by accident met with a circular issued by B. Bryan, Esq., urging the members of the Pharmaceutical Society to vote for me, among others, on the assumption that a protest is needed "against the introduction of experiments upon living animals into the operations of the Pharmaceutical Society, or the promotion of such experiments, either now or hereafter, by the Council."

As a matter of fairness to my colleagues on the Council it is my duty to say that I am at a loss to know why I am thus selected by the large committee of pharmacists whose names appear at the head of the circular, for I have never received communication from any one of them, although personally acquainted with a large number, nor have I expressed my views upon the subject which they hold of such vital consequence.

A circular asking me to give a pledge on the subject of vivisection was sent me early last week, but I put it aside, and did not answer it, because as member of the Council my actual experience during the last three years tells me

how absurd it is to connect the Research Laboratory of the Pharmaceutical Society with such a matter.

This circular further proves the absurdity of this connection, for it gravely urges the members of the Society to vote for all the members of the present Council who at this time are, and from the commencement have been, serving on the Research Committee, except the President.

As I do not desire to receive support at the forthcoming election on false pretence, I must ask you to publish this, as also my opinion that this interference is uncalled for, and moreover my earnest hope that the day is far distant when the need shall exist for the question of vivisection to cause further division in the already over divided pharmaceutical body.

Mardol, Shrewsbury. W. Gowen Cross.

Sir,—By this morning's post I have received from a personal friend, who is at the same time a staunch friend to pharmacy and our Society, a circular signed by "Benjamin Bryan," recommending to the favourable notice of the members of the Society certain persons for election to the Council, and asking me, as my name is in the list, to say whether it has been issued with my authority. As such a circular is calculated to confuse and mislead some persons in voting, may I ask your permission to reply to my friend in your columns? With regard to my own name being included in the fourteen who are commended by this circular, I may say that I have never at any time, either privately or publicly, stated my views to be either in accordance with or adverse to the views of the compilers of the circular. It is reasonable to suppose that what is true in my own case is more or less so in the case of the other thirteen. What makes the circular of even less value is the fact that of the three names omitted from the circular, one, at least, is well known to have opposed the Research Laboratory on many occasions.

I will not trespass upon your space to enter at all into the merits of the question, or attempt now to controvert the assumption that the result of the Research Laboratory will be the institution of vivisection at Bloomsbury Square. But as this raises an entirely false issue, I write this to express the hope that my fellow members of the Pharmaceutical Society will not be misled by this circular into abstaining from giving their votes to the men who have served them so well in the past, and against whom there is not even the excuse of a probability that they are in favour of any practice which will be repugnant to any section of the members of our Society.

Newcastle-upon-Tyne. N. H. Martin.

Sir,—Our attention has been directed to a circular issued from the offices of the Anti-Vivisection Society signed by Benjamin Bryan, and supported by twenty-eight members of th e Pharmaceutical Society, in which our names are presented as suitable candidates for election to the Council of the Pharmaceutical Society and for whom votes are solicited.

As we have not expressed an opinion upon the question of vivisection we repudiate a recommendation which has been circulated in entire ignorance of our views and which is calculated to give us an undue preference to the disadvantage of our colleagues, Messrs. Carteighe, Butt, and Newsholme.

Charles B. Allen.
Alex. Bottle.
Thomas Greenish.
Walter Hills.
Anthony Nichol.
Alfred Southall.

Sir,—Having received a circular, signed "Benjamin Bryan," headed by a list of twenty-eight so-called committee men opposed to the practice of vivisection, I cannot refrain from expressing my astonishment at the presumptuous audacity of these gentlemen "requesting and strongly advising me to vote in favour of the fourteen names annexed, and no others," for the Council of the Pharmaceutical Society. The majority of those recommended in the circular are experienced councillors, but the man who of all others for a number of years has devoted himself without stint as Examiner, and subsequently as Councillor, at great sacrifice of time and energy for the benefit of the Society, and who has for seven successive years been elected President, is not recommended by this precious Committee.

It is therefore plain that this is a conspiracy to exclude Mr. Carteighe from the Council for some other reason than that the Society has been influenced by him to promote research in the direction of vivisection, as there is not a particle of evidence to show that such is the case. It is folly to suppose that the gentlemen named in the circular, who are stated to be licensed vivisectionists, will be prevented by such tactics from experimenting on the action of drugs upon animals or otherwise, for they have abundance of means in the numerous chemical substances continually presented to them from abroad.

I trust the good sense of members of the Pharmaceutical Society will not be influenced by the circular in question in voting against the return of Mr. Carteighe to the Council. J. B. Barnes.

Sir,—A circular to hand signed "Benjamin Bryan," with a request to vote for certain members for the Pharmaceutical Council; this is surely an uncalled for interference. I find the names of Messrs. Butt, Carteighe, and Newsholme are omitted from this list. Knowing these three men so well, all voters will, I trust, do their best to ensure their election. Octavius Corder.

Sir,—Some weeks since I received a circular from a Mr. B. Bryan, which I returned to the sender simply writing the word "Humbug" across it.

To my surprise I have this morning had another from the same gentleman strongly advising me to vote for certain candidates whose names he sends me, stating they are opposed to vivisection, and to its introduction into the operations of the Pharmaceutical Society. I feel this dictation and interference in our affairs to be a piece of gross impertinence; and seeing that the name of our President is not included in the list of names put forward for our acceptance, I can only suppose Mr. Carteighe does not agree with the views of the committee represented by Mr. Bryan, and I am delighted to be able to congratulate him upon this evidence of his common sense and independence. Instead of voting for any of the names suggested I intend to plump for the President, and I hope many members of the Pharmaceutical Society will do the same.

W. H. Froom.

The Council Election.

Sir,—A circular has been addressed to me by the Editor of the *Chemist and Druggist*, requesting me to give answers to a series of questions as a guide to the electors, and with the object of infusing greater interest into the affairs of the Pharmaceutical Society. I have forwarded the following reply, and for general information I shall be obliged if you will publish it in the *Pharmaceutical Journal*. C. B. Allen.

"Sir,—I have to acknowledge the receipt of two communications from your office, viz., one from the publisher, inviting the insertion of an address in respect to my candidature at the forthcoming election to the Council of the Pharmaceutical Society, and the other from yourself, as Editor, enclosing a series of questions having reference to the same matter. Whilst I thank you for your willingness to grant me the publicity which your Journal affords, I have many reasons for declining both invitations.

"If, as you say, the view is so widely held 'that the election of members to the Pharmaceutical Council should be based on a clear recognition of their views on the prominent pharmaceutical questions of the day,' I have had the honour of a seat upon the Council for more than four years, and, taking into consideration the full reporting of the transactions of that body, both in the *Pharmaceutical Journal* and the *Chemist and Druggist*, rather than assume that members of the Pharmaceutical Society generally were not intelligent and discriminative readers of these publications, I would much prefer to believe that so far, at least, as regards old members of Council, the individuals who really desire to clearly recognize the views of candidates are already in possession of abundant information, and that these, in the exercise of their common sense, would resent any assistance either from yourself or from me which was intended to influence their decision as to whom they should accept, or whom reject.

"*Kilburn.* "Charles B. Allen.'

The following correspondence has been forwarded to us by Mr. T. H. Powell, with a request for its publication:—

[*A Copy.*]

"116, Denmark Hill, S.E., *April* 25, 1889.

"Dear Broad,—I see your name among the list of candidates for the forthcoming Council Election, and bearing in mind your action at the last general meeting and your constant activity on behalf of our profession, I shall be glad if you will inform me, before my voting paper is filled up, your views on the present state of affairs and the policy you are prepared to advocate.

"The strongest supporters of the curriculum scheme must admit that, should it become law, but little benefit will accrue to those at present in business. The benefit will be reaped by those who come after us, and it seems to me, therefore, the Pharmaceutical Society might with great advantage to itself, as well as the profession in general, endeavour to clear up the questions that have lately arisen, and which prove so harassing and vexatious. For instance, is it not possible to approach the Board of Inland Revenue with a view to clearing up the misunderstanding which, let people say what they will, undoubtedly exists, as to the liability, or otherwise, of many of the articles in which we deal? Again, is it not possible to arrive at a further understanding which shall do away with the invidious position we find ourselves in with regard to medicinal wines? Further, is it not possible to take action which shall prevent the sale of so-called patent medicines containing scheduled poisons (as, for example, chlorodyne) by every general dealer in the kingdom, supported, as such action would certainly be, by the intelligence of the outside public?

"These questions seems to me of immediate importance. I shall, therefore, be glad if you will favour me with any proposals you may consider feasible for their solution.

"I am, dear Broad,

"Faithfully yours,

"Mr. J. Morris Broad. "THOS. HENRY POWELL."

[*A Copy.*]

"510, Hornsey Road, *April* 29, 1889.

"Dear Powell,—In answer to your letter with regard to me being a candidate for the Council of the Pharmaceutical Society, I was nominated without being consulted, but finding that when I was there was a desire that I should stand, I consented to contest one of the vacant seats. I agree with you that the curriculum scheme is not by any means the pressing question that affects the business to which we belong. No doubt the patent medicine stamp duty is an evil in its present uncertain and unjust form, and should be brought to a definite issue, either by a clear understanding between the Pharmaceutical Society and the Inland Revenue, or that the duty be abolished altogether. It is very unjust that the baker next door can advertise biscuits for 'The cure of indigestion' and sell them unstamped and without a licence and that our pills and lozenges should have to be stamped, and we ourselves licensed. Again, on your second point, 'medicinal wines,' I cannot see why we should be prohibited from selling medicinal wines without a licence when we are allowed to sell medicinal spirits, tinctures, liniments and even wines themselves.

"Your third point, 'so-called patent medicines containing scheduled poisons' by any dealer. I consider that this is a gross injustice and ought to be immediately remedied. If I obtain a seat on the Council I shall be prepared to push forward for a definite arrangement by the Pharmaceutical Society with the Inland Revenue with regard to the patent medicine stamp duty and medicinal wines so as to relieve the chemist of the present injustice. I shall also bring before the Council the question of scheduled poisons being sold by persons not chemists, and try if an arrangement cannot be come to with the Privy Council to amend this point. I shall take all steps possible for the good of the trade interests of our body.

"I am, dear Powell,

"Yours faithfully,

"Mr. Thos. H. Powell. "JOHN MORRIS BROAD."

THE EVE OF THE ELECTION.

Sir,—There appear in the Journal for April 27 two remarkable letters, both of them from Harrogate, which contain such wonderful statements, and presume to tender such hazardous advice as to call, I think, for special annotation. In plain English, Sir, the writers seem to arrogate to themselves a great deal too much.

Mr. R. H. Davis wants to "draw" the candidates for councilship to express their opinions upon various little caustic questions of the time. I would most respectfully refer Mr. Davis to "History's authentic page," and ask him did such a course ever pay? Has the game ever been worth the candle, ever helped to gain a seat for any one at the Council of the Pharmaceutical Society of Great Britain? *Experientia doceat.*

As to the query, "What is the principle that guides members of the Society in making their selections from year to year?" I would suggest that it probably is a proved willingness, earnestness and capacity to do the work. What lends some colour to my suggestion is that, as a rule, by reference to the statement of attendance of members of Council at Council meetings and committees in the Journal for the first week in May, one can usually tell, pretty nearly, who amongst the old members will be nearest the top at the next poll. May not this likewise be the reason for what Mr. Davis calls "the indifference shown by members in the non-return of voting-papers?" Might it not be that such perfect satisfaction fills the minds of the quiet, earnest, business-like men who form the large majority of the members of the Pharmaceutical Society as causes them thus to take it easy, and let the noisy ones have their way for a little while, until noise and bustle having subsided they, too, rest from their labours, recruit their strength for the next onslaught, and so on *ad infinitum?*

Well, all this may remain matter of opinion; but there is a portion of Mr. Davis's letter that cannot be thus leniently dealt with, being in fact an unwarrantable assumption. He says "there is hardly a meeting of the trade held in any of our provincial towns when the Society is mentioned but it is greeted with derision." Now this is too bad, being composed in such a slip-shod manner, and containing such a grave statement. Surely we in other parts of Great Britain have at hand as ready facilities for knowing what is going on at meetings in provincial towns as have the folk at Harrogate. It may be very benevolent and kind of Mr. Davis to thus espouse the cause of the restless spirits, but let him take good heed they do not him very much mislead, for such are ever prone to make a groundless assertion, and then to argue from the groundless assertion as if it were an undeniable fact.

Marylebone, N.W. J. C. HYSLOP.

"WHAT IS THE USE OF THE PHARMACEUTICAL SOCIETY?"

Sir,—This is a question about which I have been much exercised of late years, and especially so at such times as the annual subscriptions become due. I have been connected with the Society now for more than forty years—which means so many guineas (nearly) out of my pocket—and what corresponding advantage have I obtained except the Journal (which is poor value)? Simply nothing, save empty honour.

I am quite prepared for the rejoinder, that this is a very mercenary way of looking at the subject, and is unworthy of an old member of the Society. Be that as it may, I am not alone in this view by any means.

Many are dissatisfied with the free and easy way in which the accumulated property of a generation has been "squandered" to carry out a fantastical scheme in the shape of a "research laboratory," designed to benefit the few at the expense of the many.

The Executive of the Society has of late quite ignored the fact, "that it was originally established for the 'protection' of its members and the trade generally," as well as the laudable desire to elevate its standard of knowledge.

It has been recently said (in the Journal) "that those outside cannot expect the Society to attend to their interests." In a sense this may be true; on the other hand it may be remarked, the Society has no right to legislate and ride rough shod over the general body in opposition to its wishes, for it is plainly the minority striving to rule the majority.

Now, Sir, I am one of those who consider that the Society has failed in its duty, and especially so in reference to the Medicine Stamp Act. It is all very well to say, "we

must not assume a defiant attitude," or "so long as it is the law it must be obeyed," etc.

As a body, I consider we are a law-abiding and long-suffering class, but I for one fail to see any reason why we should go, cap in hand, to the powers that be, and ask them to grant as a favour what we may very justly look for as a right.

As one or two of the writers in a recent number of the Journal very justly remark, "The Medicine Stamp Act, and the way in which it is administered, constitutes a very real and vexatious grievance," and it may well be asked, from whence do the authorities derive their power to veto the right of the vendor to break open a stamped package and sell out portions of its contents without re-stamping? So far as common sense interpretation of the Act goes, an article having once paid the stamp duty has gone beyond the control of the Commissioners, and left them no power to dictate further terms.

"So long as the law exists its provisions must be respected, and any disputed points must be settled either by arrangement with its administrators, or by recourse to legal tribunals." Thus saith the mouthpiece of the Pharmaceutical Executive.

The question very naturally arises, Is it the law?

The Society is in possession of an Act which it considered gave it the power to prevent anybody assuming the title of pharmaceutical chemist, chemist and druggist, and so forth.

It was decided by a legal tribunal that the Society possessed that power, only in a limited sense.

It may be, perchance, that this Medicine Stamp Act labours under a similar defect, and needs to be brought before a legal tribunal to set the matter at rest.

Upon whom then does this duty devolve? Not on the individual; for there is not one in a thousand of us who could bear the strain.

Clearly to some of us it is the duty of the Society to take this matter up, and carry it to a definite issue.

Lamplough carried the day against the vexatious interference of the authorities in his case; and I fail to see why the Society should not test some of these questions in a court of law. It is entirely owing to its supineness in such matters that the question is so often asked, "What is the use of the Society?"

It appears to me that the aim of the Society is to subjugate the whole craft by means of an obnoxious "Coercion Act;" else why so persistently push on this compulsory Curriculum Bill, denuded of the tail which was tacked on by my Lords. It is true then it was set forth as in the interests of the public, but there was no ground for it, hence its preamble was simply ignored.

As it now stands, it is valueless; the real issue, viz., neglect of, or imperfect attention to, early education, which appears to have been the complaint of some of the Professors and Examiners, notably arithmetic, would not be touched by it.

If the Bill passes (and my desire is that it may not pass), what end would be gained by it? If the desire is to create professional men, then go in for power which shall bring in some reward for labour and outlay. It is simply nonsense to attempt to compel men to be educated above and beyond the position which as pharmacists they will be called upon to fill.

Use as much tall talk as you will, you cannot wipe out the fact that the pharmacist of the future will have to consider the question of £ *s. d.*, just as much as his brother pharmacist of the present and of the past has had to do, and if the Society has nothing better to offer him than the dry bones of a Curriculum Bill added to an already discredited Pharmacy Act, it had better let the matter alone, until it has something better to put in its place.

It is all very well to talk about the altruistic method; but when denuded of its wordy gloss, what is there left? simply airy nothingness.

It is considered by many of us that the present methods are ample to test the proficiency of the men entering our ranks, and fully so for the safety of the public; and if we would have a better state of things in our midst, we must set about the cultivation of that rare growth, "brotherliness," in our craft, to replace that baser weed which is too common, "the one trying to best his fellow," and we believe that it is in the power of the Society to accomplish this to a very much larger extent than it now does.

Brighton G. G. Hornsby.

Suggestion as to a Diploma.

Sir,—Now that so much is said against the Pharmaceutical Society by pharmacists, some of whom are connected with the Society, and some not, I think it would be a step in the right direction if the Council of the Pharmaceutical Society were to consider the advisability of conferring upon all associates a certificate, or diploma. I would suggest one about the size of the Minor certificate, but more elaborate; something one could look at and admire. This I believe would give great satisfaction to many, like myself, who have joined the Society, but have had no acknowledgment for it but the usual official receipt.

I am fully persuaded that this would tend to bring about a better feeling toward the Society among that able body of pharmacists (Minors) than at present exists; also, I believe that the number of associates would be greatly increased, as the certificate would be a great temptation to many besides myself.

I should be glad to see the opinion of others upon this subject.

Norwich. A. P. S.

Chemists and the Railway Rates Bill.

Sir,—After reading the account of the proceedings of "The London Chamber of Commerce" in last week's Journal with reference to the new "railway rates legislation," I feel the subject is one which may well engage the attention of provincial chemists throughout "the kingdom," because there can be no possible doubt that if these changes are only permitted to come into force, a considerable increase in working expenses will accrue, and anyone conversant with our business at the present time is well aware that the position of affairs does not warrant the addition of fresh imposts, but rather in consideration of the fact that the claim charge for chemists' goods is not more than 1*s.* per cent., a modification of the rates already in force might reasonably be expected. I hope, therefore, that chemists throughout the country will do all in their power by means of signatory protests and in other ways to defeat what is nothing less than a gross attempt to obtain an unfair legal monopoly.

Ashby-de-la-Zouch. G. W. Bullen.

Sodium Salicylate and Antipyrin.

Sir,—In the Journal for April 27, I noticed a paragraph on the action of sodium salicylate on antipyrin. It is there stated that a mixture of these, in powder, react, forming an alkaline paste. This is true only so far. I have by me a bottle containing these substances which I filled in the middle of November, 1888, and the reaction has not yet taken place. The mixed powder has an acid reaction and gives the ferric chloride test for salicylic acid.

A portion of the same mixture exposed to the air on a piece of paper becomes deliquescent in twenty-four hours.

I enclose the bottle for your inspection.

℥ss.

Pix.—Ordinary stick lac.

Ajax.—(1) Eyre and Spottiswoode, East Harding Street, Fleet Street, London; but see *Pharm. Journal* for February 9, p. 635. (2) Yes. (3) You are recommended to address this question to the Secretary.

J. Rodgers.—(1, 2 and 3) *Conium maculatum.* (4) *Draba verna.*

Phaque.—The sale would probably be considered a wholesale transaction, and as such exempt from the provisions of the first fifteen sections of the Pharmacy Act.

J. Austen.—See an article on the "Preservation of Plants for Herbaria," *Pharm. Journal*, [3], vol. iv., p. 754.

Ephestris.—Bentley's 'Manual of Botany.'

Qualified Chemist.—(1) Yes. (2) Yes, unless it came within the definition of a "vesicating liquid preparation." (3) Yes.

R. Bayley.—The address of Nobel's Explosives Company is 85, Gracechurch Street, London, but we are not sure that we have deciphered your writing correctly.

Erratum.—On p. 851, col. ii., line 4, for "Rapid Filtration," read "Rapid Percolation."

Communications, Letters, etc., have been received from Messrs. Wilson, Sawer, Blandford, Hesse, Stark, Newsholme, Cripps, Guyer and Shapley.

ANNUAL DINNER OF THE MEMBERS OF THE PHARMACEUTICAL SOCIETY AND THEIR FRIENDS.

The Annual Dinner of the Members and Friends of the Pharmaceutical Society of Great Britain was held on Tuesday evening, the 14th inst., at the Freemasons' Tavern, the chair being taken by Mr. Michael Carteighe, President of the Society.

The gathering was about as numerous as usual, and amongst the guests were Sir Frederick Abel, C.B., F.R.S., Secretary of the Imperial Institute, Dr. James Bell, F.R.S., President of the Institute of Chemistry, Dr. T. Buzzard, President of the Harveian Society, Mr. Wm. Carruthers, F.R.S., President of the Linnean Society, Sir Andrew Clark, Bart., President of the Royal College of Physicians, Mr. Wyndham Cottle, Mr. Wm. Crookes, F.R.S., past President of the Chemical Society, Dr. Curnow, Dr. W. H. Dickinson, President of the Pathological Society, Dr. J. Langdon Down, Dr. T. Stretch Dowse, Dr. Farquharson, M.P., Professor Michael Foster, Secretary of the Royal Society, Dr. A. L. Galabin, President of the Obstetrical Society, Mr. Christopher Heath, President of the Clinical Society, Sir Guyer Hunter, M.P., Sir Trevor Lawrence, Bart., M.P., Professor John Marshall, F.R.S., President of the General Medical Council, Mr. Ludwig Mond, President of the Society of Chemical Industry, Sir Tindal Robertson, M.P., Dr. W. J. Russell, F.R.S., President of the Chemical Society, Mr. T. Skeel, Master of the Society of Apothecaries, Dr. Thomas Stevenson, Professor Stokes, M.P., President of the Royal Society, Dr. C. T. Williams, President of the Medical Society of London, the Mayor of Windsor, and Mr. H. Trueman Wood, Secretary of the Society of Arts.

After dinner, the PRESIDENT proposed the health of "The Queen," which was received with the usual loyal enthusiasm.

The "Houses of Parliament" was the next toast, proposed by the President, who referred to the glorious past, and, as every one would hope, the still more glorious future of the Houses of Lords and Commons. He would associate with the toast the names of two friends of the Pharmaceutical Society, Dr. Farquharson and Sir Guyer Hunter. Both these gentlemen were distinguished members, and were alike in being educated men in medicine. Educated men in any branch were not very plentiful in the House, and he hoped their numbers would be increased in future parliaments.

Dr. FARQUHARSON in replying said he could not help feeling that the responsibility resting upon him was not lessened by the fact that he had to act as spokesman for a large number of much more eminent and distinguished personages than himself. He had to respond for about 450 Lords and about 650 Commoners, and however opposed these gentlemen might be in many things, he was sure that they would all agree in one thing, that they would have been very glad to be present there, partaking of the hospitality of the Society. The House of Lords, like every other body, was very much criticized, but he thought its great fault was that it had not enough to do, and if it had more to do it would be happier, and would be of greater service to the country. The House of Commons, on the other hand, had too much to do. He did not know whether the present company were in the habit of reading the debates, perhaps they were too wise to do so, but anyone who did read those debates would see that there was a great deal of wrangling, and that the House did not do the work it should, and he was ashamed to have to say that the Pharmacy Bill had not been passed. The responsibility of that Bill had, he feared, somewhat shortened his life, though he had some valued colleagues to assist him, notably Sir Guyer Hunter and Sir Henry Roscoe, who had lent their aid. But when there seemed a prospect of getting it passed, all at once some miserable assassin put his dagger into it, and slew it. He could only say they would do all they could, and he hoped they would get it through some day. His great disappointment was that big things passed and little things did not. He was constantly disappointed in that way, because his hope was that he might in some way be a go-between between his own profession and the House of Commons, and in his profession he included pharmacy, because he was once a lecturer on pharmacy, and he always liked to hear of infusions, tinctures and extracts. If he could ever be of any service to the Society, or any member of the profession, he should always esteem it a privilege.

Sir GUYER HUNTER said he was glad to hear what his colleague had said as to the merits of the Houses of Parliament. Every year a Bill came forward which suggested the abolition of the House of Lords, but it seemed to him that being not elective, but hereditary, not pledged to anything, it ought to be an assembly dealing impartially with all questions which came before it. It might need reform, as every institution did; as the Calais Commissioners, in the days of Henry VIII., were taxed with changing their opinion, said, "Now is now, and then was then," and so it might be said of the House of Lords. There might be members who were a disgrace to it, but there were also members of the House of Commons whom the representatives of the people would be glad to get rid of, not on political, but on moral grounds. But looking at the legislation of the past year, he thought the House of Commons had deserved well of the country; the conversion scheme, the Local Government Act, the Mines Registration Act, of which Mr. Burt said that it was the most liberal measure ever brought forward, were quite sufficient to show what the present Government had done. The House of Commons had now before it a Local Government Bill for Scotland, which had received almost unanimous support, and before long he hoped to see an Irish Local Government Bill also.

The VICE-PRESIDENT (Mr. Alexander Bottle) next proposed "The Medical Profession." He said Lord Wolseley at Oxford had recently claimed a high position for the profession of arms, and he was not disposed to break a lance with him on that subject, but still he should place the profession of medicine far higher, inasmuch as the object of the profession of arms was to shed blood and to sacrifice life, while that of the medical profession was entirely humanitarian, and in an entirely opposite direction, the preservation of life, and the restoration to health. The medical profession was a noble one; it comprised men who at the outset of their lives devoted their best energies to endeavouring to alleviate the sufferings, and to preserve the lives of their fellow men. They introduced everyone to an independent life in this world, and watched over them during infancy and manhood, and attended them in all the incidents and accidents of life. It included not only celebrated specialists who at a glance could indicate the character of a disease and the lines of curative treatment, and men who practised medicine in palaces and large hospitals, but also those who pursued their profession in the country while at the bedside of the poor, and in the streets and alleys of large cities; for wherever there was illness or accident the medical man was always to be found. He would always claim for medicine that if it was not an exact science it was a pre-eminently advancing art. He remembered very well the days when the leech and the lancet and the blister were in constant use, but now the leech was a thing of the past and the lancet almost so, while the use of the blister at the present day was a source more of the counter-irritation peculiar to pharmacy than to the cuticle of the patient. Coming from ancient to modern medicine the stetho-

scope and the clinical thermometer were in the hands of every medical man, and the microscope in his study threw an electric light on much of the treatment of the patient he had been attending upon. He believed the advance of pharmacy had added a little to the modern progress of medicine, and that pharmacists to some small extent had contributed their mite to the alleviation of human pain and suffering at the hands of medical men, and if they had done so they were amply repaid for all the labour and time they had bestowed upon the profession. He begged to couple with the toast the names of Sir Andrew Clark, Bart., President of the Royal College of Physicians, and Professor John Marshall, President of the General Medical Council.

Sir ANDREW CLARK in responding said it was a happy thing to find among the number of persons all united in the great work of human service, that they were united in such close ties of amity, confidence and respect; and it must be clear to both sides of the profession that that was so there at least. The physician's part of the work was indeed a very serious one, and no one who addressed himself to it in singleness of heart and purpose, in the love of truth for the good of man, but would find that it was difficult, obscure, everywhere surrounded with the possibilities of error, and burdened with the gravest of all human responsibilities. It demanded not only the sympathies but the forbearance of every honest man and every true woman. And there was another side to it for those who, like himself, believed that there was something more in the universe than was seen, a capability of a higher life than that which we now lived. It was a splendid discipline, and no man could undertake and pass through that discipline in the frame of mind in which he ought to do without becoming better and wiser. The pharmacist's part of the work, or at least some part of it, was easier. The mechanical side of it was clear, accurate, capable of completion and verification; all that was easy, and it had indefinite sources of improvement, but there were two other things which, if he read the history of the human race aright, were not easy to give, an unflinching honesty and an unflagging loyalty. Speaking as one who knew pharmacy pretty well all over the world, he could say that those who practised it had thoroughly gained the confidence of physicians and their high respect. This was very high praise, and he was sorry to have to recall its significance by saying something which might be not pleasant to hear, for English societies and Englishmen of this day were not the English societies and Englishmen of eighty or one hundred years ago. It was true that we had gained in knowledge and in capacity in applying it to the business of life, in refinement, in intelligence, and in many other things. But in the race for wealth, for luxury and for ostentation, we had lost many things that were most precious in those days; we had lost something of the manliness of honour, the love of truth, and the thoroughness of work which made in those days the name of an Englishman the name of a true man, and English work to be good work. It was not in those days, but in these, that in the leading school house in Shanghai there was written up a motto on the frieze, "Beware of dealing with Englishmen, they are cheats." But when he said, as he had, that medical men accorded to pharmacists the full meed of respect for honesty of work and loyalty to those for whom they were working, he was saying one of the biggest things that could be said of any society of men in these days. He could only express the hope with all his heart that both might so do their work together that they might contribute to bring back those good old days when it was said, and said truly, that to be an Englishman was to be a true man, and that English work was good work.

Professor JOHN MARSHALL said, after the eloquent but somewhat depressing speech of Sir Andrew Clark, it was rather difficult to deal with this toast in a manner suitable to a convivial meeting, but there was one little chord touched by Mr. Bottle which encouraged him to speak a little more cheerfully. He had told them that he was thinking not only of those who represented the profession in this great metropolis, and came into close contact with that most successful Society, but he cast his view abroad over their poor professional brethren, who ministered to the poorest persons in the land, and he spoke the sentiments of the profession in saying that they all thoroughly appreciated the work of the Society. The present state of affairs was a great advance upon the past, when there was an indiscriminate mixture of drugs with ordinary articles, and all sorts of impurities were known; but they had now, thanks to the influence of that great institution, purity of drugs, uniformity of composition, and careful administration, so that medical men could now have implicit faith in the powers and properties of the medicines they prescribed. Some years ago this was not the case, and although individuals had done an immense deal of good work and devoted a deal of time and labour to the improvement of pharmaceutical preparations and processes, no individuals could grapple with such a large task; but now, with 5000 members scattered through the land, each ambitious to retain his hold on the parent society, and to do credit to it in every respect, to improve the art and the character of drugs, and to give physicians and surgeons confidence that what they ordered would be really administered to their patients, they were able to do the work it was impossible that anything but a Society like that could have been able to accomplish. Not only did they recognize, therefore, the past services and the present utility of the Society, but they looked forward to the future, and trusted that through the energy of the junior men, guided by the wisdom of their seniors, they would continue to advance the science of pharmacy to a higher position, until the present generation would be left behind by the superior capacity of their successors. The medical profession welcomed them in this respect also, that the more they were interested in their own work, and the more scientific view they took of it, the less would they be inclined to grasp at the little pilferings which, in the old-fashioned times, their humbler predecessors were too often apt to indulge in, and they themselves would aspire to a position higher than that of the old-fashioned druggists. Old ideas would fade away; the Society would develop and be the vanguard of a movement which would leave to the medical profession their legitimate duty, whilst pharmacists would be their useful and honourable assistants in the work of doing good to all classes of the community.

The PRESIDENT next proposed "The Learned and Scientific Societies," which were nearly all represented there that evening, he was happy to say, and in addition to the Presidents of many special societies, he was glad to welcome the President of the oldest of all, and that which had been the main instigator of all scientific work, the Royal Society. He would therefore couple with the toast the name of the distinguished President of the Royal Society, Professor Stokes, who, besides the burden involved in his professional capacity at Cambridge, and the enormous duties which he had to perform, had nevertheless carried out the wishes of all scientific men in becoming the representative of science in the House of Commons. He would also couple with the toast the name of Mr. Crookes, who had recently been elected a honorary member of their Society. The only honour they were able to confer as a humble recognition of the services rendered to science by distinguished men was to place them on the limited list

of fifty honorary members, and to that list the name of Mr. Crookes had just been added. He was known not only as the discoverer of thallium, but also as a philosopher who had done an enormous amount of work during the last ten years of a special and highly philosophic kind in a region which very few men dared to attack.

Professor STOKES in responding said he could not pretend to speak for the learned societies other than scientific, and even as regarded them he could only very inadequately venture on describing anything they had done. Nowadays, science was something like an old couple with a numerous family who were scattered all over the world, and some of them saw but little of each other, and those who specially pursued different branches of science attended comparatively little, it might be, to other branches. Yet as the scattered members of an old family retained an affection for the old home, so these numerous societies had a sort of filial affection for that old Society which he represented. They came to its meetings to meet one another, and heard the papers which were read, one or two on their own branch, but the greater number on some others, but which tended to keep up the knowledge of other branches; and without such mutual intercourse, and without keeping up some sort of knowledge of the various departments of science on the part of specialists, they could not even cultivate their own pet science to the best advantage. All branches of knowledge were so related that none could be entirely ignored. For instance, in some of its aspects electricity had a bearing on the function of life, and on the pursuits of those who endeavoured to influence its functions by a different method altogether. One man studied the discharge of electricity, say by an induction machine, and then, perhaps, another, the character of the light which came from it, and he composed it by a prism, found what it consisted of, some parts visible and some parts invisible; another would see what these various components would do with reference to ponderable matter of this or that kind, and in doing so it was often found that there were relations between the effect which light produced on these bodies, and which they in their turn produced on light, and this knowledge often afforded invaluable tests for discriminating between and detecting the presence of those bodies Thus in the study of the electric spark, and of the invisible rays of light which indirectly might be rendered as good as visible by suitable means, it was oftentimes found that those rays had peculiar relations to certain bodies which enabled them to discriminate one from another, and to detect very small traces of them.

Mr. WILLIAM CROOKES, in responding, said he might be allowed just to make a few remarks on the more special subject which the President had mentioned. He felt it a very great honour to be elected an honorary member of the old Society, and still more so that he had been elected simultaneously with Dr. Burdon Sanderson. He considered that this election was an illustration of a triad union which had for some time been getting more and more close amongst the sciences. He might be considered an unworthy representative of pure chemistry, Dr. Burdon Sanderson of physiology, and the present meeting of pharmacy. In olden times pharmacy consisted in taking the crudest possible materials, animal, vegetable or mineral, and administering them without any attempt at purification. Then attempts were made to separate the active principles from the inert woody fibre and other substances, and these results were most successfully carried out in the preparation of pure substances like morphia, quinine, and bodies of that kind. They were now not content with that, and research carried out in the laboratory was giving them bodies artificially prepared, such as salicylic acid, which was prepared without the intervention of life, etc., and other bodies, such as antipyrin, antifebrin, resorcin, sulphonal, and other bodies of that kind, which had never existed before they were prepared artificially. And there was this thought, that if these bodies which had been prepared by scientific men who had been working purely in the interests of the dyer and tissue printer had proved so valuable to pharmacy, and to the health of the community, how much more likely was it that this object would be attained when scientific men, whose centre of thought was devoted to the alleviation of human ills and the discovery of new medicines, if eminent scientific men, such as Professors Dunstan, Attfield and others, working in this magnificent research laboratory devoted themselves to the subject of discovering new bodies capable of being administered in medicine. The pharmacy of the future would be almost purely in that line. Whether they would educate plants to afford new and approved principles in the way they had been attempting to give new flavours to their fruits and new tints to their flowers, or whether substances would be manufactured in the purely experimental laboratory he knew not, but two things were certain. In the first place the physician would be able to call upon the pharmacist to give him a substance which should act in a perfectly definite manner and attack the symptoms he found in his patients, and on the other hand the old sneers against both pharmacists and physicians of putting things they knew little of into organisms they knew less of, would be a thing of the past.

Sir TREVOR LAWRENCE, Bart., M.P., proposed "The Pharmaceutical Society, and the health of the Chairman and President." In so doing he was carried back some thirty-five years, when he was a student of practical pharmacy in the laboratories of Messrs. John Bell and Co., and he still possessed the certificate signed by his old friend, the former President, Mr. Hills, the kindest, most generous, and most unselfish of men, in which he testified to the proficiency he had attained. He also remembered his telling him on one occasion when he had taken great care to prepare a a particular prescription that after he had left the premises equal care was taken to see that it was thrown away. The Pharmaceutical Society needed no praise from him, it stood between the public and ignorance, and in that position discharged a duty of the greatest possible importance. Reference had been made to the admirable work already done by the Society, but he ventured to think that as the investigation proceeded further discoveries had yet to be made, and new worlds yet unconquered had still to be annexed for the benefit of humanity. He had heard some things that evening which had pleased him, some which had surprised him, and some which had pained him. He was surprised to hear the President suggest that it was not for them to criticize members of Parliament, for that seemed to be the one thing which everyone took a delight in. He was more especially pained, however, by one remark made by his friend, the member for Hackney, to the effect that the members of the House of Commons were a bad lot in comparison with the House of Lords, and he could only say that no one could afford less justification for such a statement than his colleague. He could not take such a pessimist view of society as seemed to be entertained by the President of the College of Physicians. Were we really forgetting all the best principles of human nature in the race for wealth? He ventured to think that a larger, deeper and wider charity prevailed at present than at any former period. It was not an Englishman, but an American, who, it was said, was going about the globe with a view to purchasing it if found suitable. No doubt there were cases of luxury which all would condemn, but that was not the prevailing spirit in this country. These, however,

were hardly the subjects for an after-dinner speech, and he would turn to a more congenial topic, the merits of his friend in the chair, who was the most agreeable man to sit next to that could possibly be imagined. He only regretted that he could not at the moment recollect and make use of many things he had told him regarding the Society and its history. It was impossible for any man to have filled such an important post for seven years successively without possessing qualities of an unusually high order.

The PRESIDENT, in responding, said he would not weary his guests by talking politics, but he should like to say that there were present representatives of the various branches of the executive body of the Society, for whom, as President, he entertained the highest possible respect; and as to whose services in the past and in the future he desired to say a few words. There were present three distinguished members of the North British Branch, who were also examiners in Scotland for the Society. He desired to thank Mr. Gilmour, the Chairman of the Executive, for his presence. There were also present a number of local secretaries from different parts of the country, to whom they always turned in times of difficulty and danger. It was said that the Pharmaceutical Society did not exist in any sense for the protection of trade interests, and that was quite true if those trade interests were antagonistic to those of the public; it could not become a trades union, and so long as he had a voice in the administration, and remained a member of it, whether in or out of the Council, he should raise his voice and hold up both hands against any prostitution of its great powers to purposes of that kind. It was no use blinking the matter; that was not the object with which the Society was founded. It was founded to protect them from dangers which came from without; it was not for them to go to Parliament and ask it to do something to benefit them personally within. Possibly they might go to Parliament for those things which benefited the public at large, and coincidently and remotely benefited themselves; but speaking broadly, no corporation with a character to lose, and they had existed fifty years, dare go to Parliament and ask for any special privileges of that kind. They were servants of the public, and whether they liked it or not must carry out the trusts confided to them by two Acts of Parliament and by the Charter of 1842. Amongst the local secretaries spread throughout the country there must be differences of opinion, but when he explained to them the precise powers the Society had he never found one who dissented from the general lines on which the policy of the Society had been conducted. It had lately been suggested that divisional secretaries should be appointed in the metropolis, who should be encouraged to communicate with members of the trade, and ask them to co-operate in all matters which were of general interest to the whole body, and not long since he had presided at a meeting of some fifty of such divisional secretaries, when he found that every man was willing to exert himself to assist the Executive, and that their difficulties arose more from ignorance than from a want of activity on the part of the Council. The Council which he represented was simply a figure; it had to be carried on on public lines for the public good, not for personal gain, and no corporate body would be tolerated in these days that desired to obtain for itself powers which were contrary to the public welfare. As the figure-head of that body he had been selected to be dismissed the next day, to make room for some one else. In carrying out the duty of advancing chemistry and pharmacy the Council had undertaken original research, and thereupon some other body came forward, and for the sake of advertisement wanted to get rid of the President and some other members of the Council. He did not object to any members of the Society associating together and saying that he was a trouble-some person who ought to be got rid of, but he did object when twenty-eight members could not manage the matter themselves and went to some one else to do it, and to influence members of the Society in the pending election. He only referred to this matter in corroboration of what Sir Andrew Clark had said, that in many respects the good old times had passed. In those days men fought fairly, and he did not like anything unfair; and when circulars were sent out containing untrue statements he protested against it. He would again express his gratification at the support he had received from the numerous guests, for however large the organization of the Society might be it was impotent to carry on any really useful work without the co-operation of every branch of medicine and science connected with pharmacy.

The PRESIDENT again rose to propose the last toast, viz., "The Guests," with which he coupled the names of Sir Tindal Robertson, Sir Frederick Abel, and the Mayor of Windsor.

Sir TINDAL ROBERTSON, Bart, M.P., said he had not before had the privilege of being present at a dinner of the Pharmaceutical Society, but he very much appreciated it. He had not such a high opinion of the House of Commons as some gentlemen seemed to entertain, and he thought members of that Society might perhaps be of some service to them; some of the bromides might cure them of the bad habit of sitting up so late at night, and a subcutaneous injection of morphia might remove some irritability of temper; but he doubted if anyone present could cure the plethora of talk which overwhelmed them, and was a great injury to that and other societies and to the country generally. They had in consequence no power to turn their attention to a great many things which they ought to consider. At present their whole time was occupied by party questions, and a great many social matters which affected the health of the people were neglected. It was on this account that the Pharmacy Act Amendment Bill had been put aside. It proceeded, so far as he could ascertain, on the same lines as many other Bills of the same kind, proceeding from other learned societies. The Preliminary examinations were now made much more strict than they were formerly in his own profession. When he went up to the Apothecaries' College, he was reminded by a friend of a case in which a candidate was asked to translate the motto of the Society, which was "*opifer per orbem dicor*," and he translated it, *opifer*, I am called; *per orbem*, through the world; *dicor*, a doctor. That was the kind of education that people, even on entering the profession of medicine, received in his early days. The Pharmaceutical Society had now determined that it would educate the junior members of the profession as far as possible in the best and most perfect manner, and he thought it was doing in that respect a great and good work. Every science had improved of late years to an enormous extent, but none so much so as chemistry, and particularly organic chemistry, and this being so, surely those who were the pioneers of the profession were entitled to attention from the Legislature, when they brought forward a Bill for their own advancement and for the protection of the public. There was no doubt that the Bill would be for the advancement of pharmacists themselves, for it would ensure that every man who came into the profession should attain a higher standard. He wished the Society every possible success, and thanked it for the very cordial reception which had been accorded to its guests.

The toast was also briefly responded to by Sir Frederick Abel, who said he had long been a sympathizer with the good work of the Society, as well as by the Mayor of Windsor.

During the course of the evening Mr. Corney Grain gave a charming selection of songs and sketches.

The Pharmaceutical Journal.

SATURDAY, MAY 18, 1889.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE ANNUAL GENERAL MEETING.

THE report of the annual general meeting of the Society this year contains matter that merits the careful consideration not only of every member of the Society itself, but equally of every individual who is connected with the business of pharmacy. Though it cannot be said that any one of the numerous subjects referred to was at all fully discussed, they were at least dealt with from different points of view in such a way that much instruction may be derived from what was said. In regard to the general work of the Society and the mutual relations between its executive and the members, forcible expression was given to some wholesome truths which have been too much lost sight of by malcontents and grumblers who otherwise take but little part in helping forward the work that is undertaken for the benefit of the body at large. It would be impossible on the present occasion to attempt to summarize the proceedings of the meeting, for the report itself takes up more than the space of an ordinary number of the Journal; but we may at least direct attention to the remarks which were made on the basis of the assumption that the Council is indifferent to and regardless of the trade interests of the body it represents. This assumption is a very common one, and it is the keynote of many of the letters which appear even in this Journal, but it appears remarkable that those who entertain the idea would seem to overlook the fact that the members of Council are like themselves actively engaged in business in various parts of the kingdom, and must therefore be personally sensible of the difficulties which have to be encountered in that position as well as sufferers from these hardships which they are supposed to ignore in their executive capacity. Very little reflection should be sufficient to convince any reasonable man of the absurdity of such a supposition, and its existence can only be accounted for by the prevalence of a want of due appreciation of the circumstances of the case and of the power of the Society or of its Council to deal with them. Most of the existing discontent amongt chemists and druggists arises from the excessive competition, which is an evil, not only in their business, but in every other business, and as regards chemists, it takes a form that cannot be remedied through the aid of the Pharmacy Act. But the absence of any possibility of protection in that way may be to a large extent ascribed to the fact that the majority of those engaged in the business have abstained from supporting the efforts of the Society to raise the business of the chemist above the level of ordinary trade. The Pharmacy Act itself was indeed all but emasculated in consequence of the direct opposition offered to the Society's Bill in 1865, and consequently as it stands it offers far less advantages of a protective nature than might have been secured at that time.

In regard to other statutes which affect the business of the chemist there is at the present time a strong feeling of dissatisfaction with the Medicine Stamp Act, and it is thought by many that it is within the power of the Council to effect such modifications of its incidence as would afford relief from the inconveniences complained of. But that belief, as we have on many occasions endeavoured to point out, is based upon misconception, and a careful consideration of the matter must, we believe, lead to the conclusion that the only possible modes of attaining such a result would be to abstain from incurring liability under the Act or to obtain a repeal of it. The former course is the more easy of the two, and although it may be attended with some difficulties or even involve disadvantages it is had recourse to by many with success. The other course of seeking repeal of the Act has been strongly advocated by many, but we think this has been done with too much precipitation and without due regard either to the probability of its being effected even by a united effort of the whole body or to the possible consequences that might follow from the abolition of the stamp duty. This is a subject that requires to be very carefully discussed before it can become ripe for any move to be made in the interests of chemists. The other subject dealt with at the meeting in virtue of a notice of motion was of the same nature. There are more ways than one of looking at it, and the proposition brought before the meeting might, if carried into effect, be eminently mischievous. Such at any rate appears to have been the view taken of it at the meeting from the very meagre support it received and the very large majority that voted against it.

At a recent meeting of the Philadelphia College of Pharmacy Mr. Michael Carteighe was elected an honorary member of the College in recognition of his distinguished services to pharmacy. At the same time Mr. W. Saunders of Ottawa, Canada, Dr. Squibb, M. J. L. Soubeiran, M. C. Tanret and Herr von Waldheim were also elected honorary members.

* * *

The Victoria University has already helped to promote the teaching of pharmaceutical students at the Owens College, Manchester, and we are glad to announce that the action taken with that object has now been extended to the Yorkshire College, Leeds. At the commencement of the present summer session the Department of Medicine received the addition of a course in Practical Pharmacy, to conduct which, many of our readers will be pleased to learn, Mr. F. W. Branson, F.I.C., F.C.S., has been appointed. Attendance at this course is compulsory for the medical degree of the University, and it also meets the requirements of all other licensing medical boards.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, May 15, 1889.

Present—

MR. MICHAEL CARTEIGHE, PRESIDENT.

MR. ALEXANDER BOTTLE, VICE-PRESIDENT.

Messrs. Allen, Atkins, Butt, Cross, Gostling, Greenish, Hampson, Harrison, Hills, Martin, Newsholme, Robbins and Schacht.

The PRESIDENT having welcomed Mr. Harrison to the Council table,

Mr. HARRISON said he desired to express most heartily his sense of the great honour which had been conferred upon him. His time was already very fully occupied, being intimately connected with municipal and public life generally in his own district, and he had not that time to devote to pharmaceutical matters which he should like, but having been thus unanimously elected he should do his best to discharge his duty, and if he should find the tax on his time greater than he could afford, he should not hesitate to give way, and let someone with more time at his disposal take his place. He must also add that he appreciated very highly the kind remarks of the President and Vice-President in proposing his election.

Several persons were restored to their former position in the Society upon payment respectively of the current year's subscription and a fine.

MEMORIAL TO THE BOARD OF TRADE.

The PRESIDENT reported that the Committee had prepared and sent to the Board of Trade the following memorial, as directed at the last Council meeting:—

"*Railway and Canal Traffic Act*, 1888.

"To the Right Honourable
The President of the Board of Trade.

"The Council of the Pharmaceutical Society of Great Britain, having duly considered the proposed new classification and schedules of maximum rates forwarded to the Board of Trade by the principal railway companies in Great Britain, and finding in them proposals of a nature calculated to affect very prejudicially the interests of chemists and druggists, humbly petitions the Board of Trade to give effect to the following modifications and suggestions in any and every classification or schedule approved by the Board of Trade:—

"I. It is respectfully submitted that any augmentation of the already high rate of carriage for drugs and chemicals would be a great injustice to chemists and druggists; and it is suggested that drugs and chemicals in hampers and cases should be retained in Class 4, as at present, and not be advanced, as now proposed by the railway companies, to Class 5. A considerable number of the articles classed by the railway companies under the generic title of 'drugs' are really goods which by themselves are carried in Classes 1, 2, 3 or 4, or even in Class C. Bulking these articles into Class 4 is putting them into the highest class which the railway companies charge for them individually, and it is submitted that this would be a sufficient rate to charge.

"II. Small parcels have hitherto been charged on a diminishing scale varying with the amount of freight itself, a table of which is published in the 'Clearing House Book' under the head of 'Scale of charges for smalls under five hundred pounds,' but the railway companies seek, in the case of two companies, to 'double their maximum rates,' and in others to charge 'such reasonable sum as the company may think fit.' As a very large proportion (about 90 per cent.), of the consignments made by chemists and druggists will come under the head of 'smalls,' this proposed alteration is one which will seriously harass and injure their business. It is therefore submitted that no railway company should have power to charge what it thinks fit for small parcels, but that either the charges shall be regulated as heretofore, or that a *limit* of say 25 per cent. on the tonnage rate should be *fixed* by your honourable Board. It is further submitted that the maximum weight for 'small parcels' should be reduced to 448 pounds rather than increased to 560 pounds, as it is proposed to do, and that railway companies be not allowed to charge for the fraction of a quarter of a ton as for a full quarter.

"III. It is also further submitted that the anomaly of empty bottles being subjected to the same rate of charge as valuable merchandise should not be sanctioned by the Board of Trade, and that returned 'empties' ought not in fairness to be placed in a higher class than Class 2. As an instance of the inconsistency of the proposed new classification in this respect, it may be pointed out that whereas new glass bottles are to be placed in Class 3, bottles which have been used and returned unwashed are to be placed in Class 5, although the original value of such bottles has been lessened. What has been urged in Clause II. respecting 'small parcels' is also applicable to 'empties,' as these are almost entirely packages under four hundredweight."

The Corporate Seal of the Pharmaceutical Society of Great Britain was affixed hereto, May 14, 1889, in pursuance of a Resolution of the Council of the said Society.

Seal.

MICHAEL CARTEIGHE,
President of the Pharmaceutical Society of Great Britain.

The Council went into committee to consider the order of business at the Annual Meeting.

FORTY-EIGHTH ANNUAL GENERAL MEETING.

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

The forty-eighth Annual Meeting of the Society was held at No. 17, Bloomsbury Square, on Wednesday, May 15. The chair was taken at 12 o'clock by Mr. Michael Carteighe, President.

The SECRETARY having read the notice convening the meeting,—

The Report and Financial Statement were taken as read.

The PRESIDENT, in moving the adoption of the Report and Financial Statement, said the financial part of this statement may be summarized very briefly in a few words. I can, if you wish, go into much detail, but you will probably not desire me to do so. Broadly, with regard to the receipts, we have an increase on most of the principal heads of receipt, excepting that of subscriptions from members. The examination fees are larger and the sum of the registration fees is a little more than last year. We have received more on account of the Journal for advertisements, which is all to the good, but in regard to members, associates, and general subscribers to the Society we are roughly about £100 poorer. This is to be regretted, not solely on account of the money, but of the

individuals, who are a loss to us. You know, gentlemen, that times are hard, and we must not be surprised to find that some of our brethren think once or twice before subscribing their guinea. But without wishing to press them unduly, I would submit to them, is it wise for our brethren in the trade to leave the only organization that has to do with our interests at a time when they most want help? That is only a suggestion, but it seems to me not good form or good business to do so. It would be better for us all, if every member of the trade were part and parcel of our Society, even if he paid us nothing. On the debit side of the account you have the sale of certain stocks to pay for the expenditure on the new building, and the details of that I went into very fully last year, so that I do not think it is necessary to go further into it now. On the other side of the account, with regard to general expenditure, apart from anything special, we find that as here stated it is roughly something less than £100 against us. With regard to that I may say that in stocking and supplying the examination rooms in the new building, both those for the purpose of practical dispensing and practical chemistry, with new apparatus and complete sets of specimens and other things to facilitate examination and to economise the time of the examiners, and so on, we have spent a considerable sum of money which will not occur again. Similarly in Edinburgh some extra expenditure has been incurred for the purpose of increasing facilities for carrying on the examinations there satisfactorily. We have had to buy furniture, chairs, tables, etc., for the new building, and we have published the library catalogue, which cost a good deal of money, and which does not come every year. Those things put together roughly amount to between £400 and £500. What I want to impress upon you is that there is a certain amount of what may be called extraordinary expenditure which for this year has been put down to the ordinary revenue account, and it is not likely to occur again—other expenses will occur but these will not. With regard to the Benevolent Fund account I do not think it is necessary to say much, except to impress upon you that these figures, large as they appear to us poor chemists and druggists when we see that the Society possesses thousands of pounds invested in freehold ground rents, really bring in but a very small annual income. I find there is a common impression amongst the members which I would wish to dispel, that we have so much money for benevolent purposes that we do not want any more. Our friends forget that we have at our disposal only the income from our invested capital, whether it be in freehold ground rents, or consols, and that we cannot touch the principal; and they should also remember further that we have elected for many years a much larger number of annuitants than we could possibly keep on the mere interest of our invested capital. We have adopted the bold policy of trusting to our members to subscribe annually a sufficient sum of money to keep more annuitants going than were originally contemplated. Many years ago I remember my predecessor in this chair, Mr. Sandford, and I really think the Vice-President also, being very much shocked to hear the proposition that annuities should be given unless we had invested capital sufficient to pay them in perpetuity. No doubt on a very strict financial basis that is a dangerous thing to do, but there were a certain number of young people about who pressed the other policy and succeeded eventually in carrying it, and I believe they were right. I believe our members will take care that the annuitants, who practically get their income from their subscriptions, will not be disappointed in the future. But I would point out to you that even if we had twice the amount of invested capital we have, it would not be too much to provide for eligible cases with regard to the annuities. The number of annuitants must necessarily be limited to the funds available, and the number elected annually depends very largely upon the number of vacancies caused by death, and the possibility of increased funds. Let me point out to you that all we can afford to give to annuitants at the present time is £30 or £35, according to their age; and I submit to you that, apart from any question whether we should not give more annuities, the amount to a chemist and druggist, a man who is really a professional man, the money you offer to him or his widow is a very small sum; after all, it is but a pittance, and I do hope the time may come when we can at least give to our annuitants a good round sum of £50 a year, or something like that. I mention this to show that those of our brethren who are disposed to give us funds which must be invested can do so in perfect confidence, for when, if ever the time comes, that we have relieved all the distress which comes before us we can turn our attention to really providing for the welfare of our annuitants. I venture to think the sum we give them now is simply a makeshift—it is not enough—but as we have to arrange our distribution according to the funds at our disposal, we have adopted the wisest policy of doing the greatest amount of good amongst the greatest number. But it is right that you should face that point, and let us all consider amongst ourselves what we should like with regard to our own brethren, particularly with regard to the men. £30 or £35 to a widow is relatively a larger sum than £30 or £35, according to the age, which we give to a man. You know perfectly well that women find little corners in the world, they nestle up amongst the younger members of the family, they can make themselves a little bit useful, even if they are in delicate health, and, therefore, they can get along comfortably in the world after a certain time of life much better than a man. To give a man who is broken down at the comparatively early age of 60 only £30 or £35 a year does seem hard lines. Then with regard to the Report itself, you will observe that our freehold ground rents are considerable, and that we have about £2500 invested in consols. Lest any of you should challenge me upon the financial part of that statement, and ask why we had not invested it in freehold ground rents, I may say that we have considered that point, and as far as possible we propose to continue the policy inaugurated five years ago, thanks to the energetic assistance of my friend Mr. Butt, Mr. Robbins, the treasurer, and others, and convert as far as possible our stocks as fast as they accumulate into freehold ground rents. I am glad to tell you that we have succeeded in fully converting a less than three per cent. stock into really a definite four per cent., including all expenses, and that means several more annuitants who can be supported each year. The first three paragraphs of the Report I have more or less dealt with; but I may refer to the third paragraph with regard to the candidates. We are sometimes told that the number of candidates will be decreased, and that some time or other possibly we may not have any money at all from candidates, or at any rate a much diminished income. It is difficult to say what may happen in this respect, but when one knows what is going on in the drug trade it is certainly wonderful to see the number of candidates who present themselves. Amongst other things it may be perhaps a surprise to you to know, what is not mentioned in this Report, for it does not come within this year's operations, namely, that at the last Preliminary examination we had a larger number of candidates than we have ever had before. Whether that is an indication of recklessness on the part of parents or of consciousness that there is some good left in the drug trade I do not know. The appointment of Visitor to the Privy Council, as has been mentioned, has been offered to, and accepted by,

Dr. Thomas Stevenson, a gentleman whose sympathies with educational work, and whose knowledge of the various branches of science and art which form the basis of our examinations is very considerable. He is, for our purposes, a gentleman well qualified, and I think we shall find that he, a distinguished toxicologist, like his colleague in Scotland, Sir Douglas Maclagan, will probably take as much personal interest in the examinations in the south as Sir Douglas Maclagan does in the north. Then there is a paragraph about the Journal. Some of our friends always like to have a "shy" at the Journal; that which is the property of the Society is always a good thing to talk about, although you may sometimes do damage to your own property, so I think I may as well talk about it myself. I am glad to tell you that we have received more money for advertisements. I do not know whether that means increased prosperity with the drug trade or not, but that is the fact. There are other Journals, but I see their representatives at my left very active, and they do not themselves contribute directly to our pages as advertisers, but, on the contrary, they want, of course, something for themselves. They are perfectly entitled and they do their best to get advertisements. We have to content ourselves with what we can get legitimately to place in our advertisement pages, and I think I may say for myself and for the whole of our members that, although it might be a financial advantage, I should be sorry to see the time when advertisements were so numerous in the *Pharmaceutical Journal* that you could not find the text. If some of you gentlemen think we are remiss in that respect you must bear in mind that there is a medium course to pursue in all these things. I know that there are men, staunch friends of the Society, who have grave doubts whether we ought to take advertisements at all; but of this I am assured, that advertisers, steady advertisers who know their business, have found that advertisements in a publication of moderate dimensions, where the advertisements bear a fair proportion to the matter, are not a disadvantage to the advertiser. With regard to the Library and Museum we have been very successful during the past year. We have received many donations, and we have bought on a liberal scale all books that require to be bought, both for our Library here and for our Library in Edinburgh. The Library in Edinburgh is very much used, and although it has not as many books as we have here, still I think it does possess the essentials of a fairly useful Library. The buildings there are used very largely by students as well as by members, and the object of the Council, as far as it can see its way to do so, is to provide its members in Scotland, especially those in Edinburgh (because members in Scotland can borrow the books and have them sent by parcel post either from Edinburgh or London), with books of reference for the older members of the Society, and educational books for the younger. I see certain friends of mine from Scotland in front of me who will be ready to correct me if I am wrong, but I think I am right in saying that that is very well accomplished. With regard to the address in October, Sir Henry Roscoe, who was, unfortunately, not able to be present last night, though his sympathies were with us, gave us an address, and to him we are also very much indebted for what he is doing for us in the House of Commons. The next paragraph, which refers to the alteration in the course of instruction in the schools, is an important one. When the Pharmacy Act passed, or rather when it was in contemplation, there were some who thought that every person who presented himself for examination, being compelled to come up for the Minor, would, as a matter of course, go on for the Major. I am bound to say, speaking for myself, and also for Mr. Sandford and Mr. Thomas Hyde Hills, we three have over and over again said that everyone who went into the Minor when he was once compelled to go on for a course of instruction would go in for the Major and become a pharmaceutical chemist. Experience has shown that we were absolutely and entirely wrong, and men are quite content to take the Minor qualification as the basis for practice. Now after the passing of the Act it was thought expedient to convert the old-fashioned long, and what I venture to call complete course which had been carried out in this institution from its foundation, into two short courses, with the result, as most of you know, of making a mess of it—that is to say, you did not give enough instruction for the Major, and even the Minor man, if he had not had a good deal of preliminary knowledge before he came here, ran the risk of coming to grief too. So we have ventured to revert, with some modification, to the original principle of having a course of six months, which we take to be a course which will qualify for the Minor, and an advanced course for the Major examination after that is finished. Allowing for examinations for prizes and the Society's examination awards, practically that is as much as we can get into the ten months at our disposal. The result of this experiment, as far as it goes, appears to be highly satisfactory. You must remember that while we made these changes on the authority of the Council and with the consent and advice of the teaching staff, we are not in any sense benefited financially by these changes. The object of this Society from the very foundation has been to provide facilities for sound education. Members of this Society of straitened means throughout the country, many still living founders of the Society, give us ungrudgingly their guinea on that ground alone, that we are fostering good education, and we are bound at all events to provide in this institution a course of instruction which shall qualify a man to be even something more than a pharmaceutical chemist if he wishes to proceed further. It is of interest to the whole pharmaceutical body that amongst its members there shall be men better than the average pharmaceutical chemist, and it is a positive benefit to every member of the craft that we have amongst us able men, who, besides being excellent pharmacists, are, I am proud to say, brilliant chemists, and most of those have been educated in the Society's School. The evening meetings have been successful, as usual. With regard to the resolution to which we call attention with reference to carbolic acid, I am afraid I have nothing more to add to that than I said three years ago, when a resolution of a similar kind was sent to the Privy Council. The view, I believe, every member of the Society holds is that carbolic acid is a very dangerous poison, and, apart from any question of trade, that it is to the interest of the public it should be in the schedule. I am bound to tell you, however, that the reasons given for not approving of our resolution and making carbolic acid a statutory poison have been that the Privy Council is itself considering the subject of poisons: that is the official answer which we must accept as such. Still I happen to know that the real answer is this, that the advisers of the department are of opinion that having regard to the value of carbolic acid for disinfecting purposes; since it is of the greatest consequence, both with regard to fevers which attack human beings and various classes of fevers and infectious diseases which attack cattle, it is undesirable to place a restriction of that kind on the sale of carbolic acid; that dangerous as it is undoubtedly, the balance of convenience is regarded by these advisers as being in favour of leaving it alone. I confess I do not agree with that view, for I think that the difficulties contemplated by the department would be got over under that portion of the Act which allows the sale by wholesale of large quantities of carbolic acid under certain conditions. But there it is, gentle-

men. I have used my personal influence and judgment as far as I can to point this out: that the wholesale clause of the Act would allow the distribution at a moment's notice of any quantity of carbolic acid, provided that it was labelled "Poison," and that it is absurd to suppose that making it a statutory poison would in the slightest degree interfere with its distribution. However, my persuasive powers in this direction have not been effectual. The Research Committee appointed by the Council made its report as referred to in the next paragraph, and I hope the results already accomplished will be considered satisfactory. The results of certain inferences from that report may or may not be satisfactory. I do not know whether they may be satisfactory to myself or not, but to some of those happy fourteen gentlemen who may happen to be re-elected they may be very satisfactory. As I do not happen to be in the list, and two or three of us are left out in the cold, I do not quite know what views we are to take of it. At all events that does not affect anything I have to say to-day, because if I were to make an electioneering speech to you gentlemen you would laugh at me, and say that the voting papers are already in the box, or in the hands of the secretary upstairs, and, therefore, I think it will be wise of me to say nothing more than that as a matter of harmony and union in a great Society like ours, divided as it must necessarily be by many differences of opinion, I do protest against any interference from outside which may tend to increase the differences among us. All our difficulties in the past have been caused by this want of union. You will remember that I have from this chair over and over again referred to the fact that in 1865 and 1866 the Council of this Society had a Pharmacy Bill which would have accomplished all that we see now we really wanted, and would have been of a nature to make pharmacy what it should be in this country. That Bill was wrecked and lost, and a poor miserable Poisons Bill was built on the ruins of that Bill—by whom, gentlemen? By a large number of chemists and druggists who would not agree with the Pharmaceutical Society. That was the very commencement of our difficulties, and I do protest therefore that whether I am to be sent about my business as a member of the Council, or anybody else is or not, that if any twenty-eight members of the Society have anything to say, let them come here and say it; but do not let them go to other places and bring up side issues, and get money from another association, and appeal to our men so that our ranks may be divided more and more in future. There is the usual clause with respect to infringements, and of course we have dealt with a great many of them. A large part of the time of the Council is taken up with these cases, and the measure of the time occupied, I beg you to understand, is not to be indicated by the length of the Report. This work is essentially legal work, and requires great discrimination and care, and of course has to be conducted in Committee; but I am bound to tell you that all the members of the Council are members of this Committee, and they attend from all parts of the country, and spend many hours on the Tuesday evening going through these cases carefully. And let me remind you that when the Council does in its judgment think it undesirable to prosecute, you may conceive there is good reason for its action. It is so common in these days of excessive literature and newspapers, such a desire is there to get news, so necessary is it to be a little aggressive, if not abusive, in order to get something spicy for one's readers, that I often think you gentlemen come to the conclusion that because no definite action is taken, or no action in a particular way, that no work has been done with regard to it, and it is so convenient to assume that an executive body which remains in certain cases passive is in itself inactive that I venture to remind you that this does not necessarily follow, and that there is a great deal more difficulty and more care and attention required sometimes to keep us inactive than to make us active. With regard to the Railway Rates Bill, gentlemen, that has been considered by a Committee of the Council, and we have sent a memorial, which you will see in due course, to the Board of Trade, on points affecting chemists and druggists. The question is one of very great importance to chemists and druggists, and to all those who have to do with the transmission of small packets. We have thought it wise to make our appeal to the good sense and generosity of the railway companies rather than to go in angrily and make imputations of, as I venture to think, a somewhat wild character. Although our business requires that small packages should be carried, we must recollect that the carriage of small packages and empties must be to railway companies a very serious matter, and I should think a serious loss, if considered *per se*; and that it is rather a question of appealing to the fairness of the boards of these great companies, who as a rule show a desire, as I hope we do representing the Pharmaceutical Society, to meet the public convenience. We have therefore simply suggested to the President of the Board of Trade that with respect to the change of classes, which does seem to us to be a little unfortunate, and probably hardly justifiable, especially with respect to the raising of classes, that it should not take place, and that certain modifications should be made with regard to the empties and to the maximum rate fixed for the carrying of what are called "smalls." We have approached the subject not only from our own point of view, but, as we think, to a certain extent, from the railway companies' point of view. You will remember that what is proposed to be done by the railway companies, or that which is sent in to the Board of Trade, is not necessarily the charge which the railway companies will make. They simply send in the charges which they are empowered under the statute recently passed to make. They are not bound to, and in many cases probably will not, charge the maximum rate which they are entitled under their Act to charge, but, notwithstanding that fact, one has felt that in certain districts where there is no competition at all—outlying districts—there would be a disposition not to be very considerate to chemists and druggists, and others dealing in small packages, and we have ventured firmly, but considerately, to place our views before the Board of Trade, and propose to send a copy of the memorial to all the railway companies. I believe that memorial will receive the attention that it deserves, and that it will be fairly considered, and that if we do not get all that we ask, we shall certainly get some relief; and if we do not get any relief at all I feel sure it will be because the directors of the companies have an unanswerable reason for not acceding to our views which we do not know ourselves. The North British Branch continues to work very satisfactorily. I am glad to see its Chairman, Mr. Gilmour, is here to-day, and two members of the Committee, and that the members of the Board of Examiners are here to say something for it, if need be. I know how much they love me, how affectionate they are to me, and how carefully they are of me when I go up to Edinburgh, so I shall not say anything about the North British Branch before them. You know that I mentioned some years ago that in the arrangements between the Society and the Duke of Bedford we had agreed to take the next two houses, and a reference is made to that fact here. We are bound to take down both houses and rebuild them. It is proposed to rebuild both, and to use one for the purposes of the Society and the other we propose to let. It will be simply changing our investment with regard to that, taking it out of stock and converting it into the building. We

propose to let it on such conditions that if at any time it may be required for the Society's purposes, say as a residence for the Secretary, or for any other purpose, it can be comparatively easily acquired. I remarked last night, and there is a paragraph here to that effect, that we have taken a new departure with reference to divisional secretaries. London has grown so big that it has become absolutely impossible to get to know the views of the members of the Society in its various divisions. I am happy to say that we have received the most cordial offers of help from our members in the various electoral divisions of London, and we hope to be able to extend these divisional secretaries perhaps to the home counties, because we do not at present go quite far enough. It is a question also for the consideration of the future Council whether the same thing might not be done in large towns like Liverpool, Manchester, and possibly Bristol and others. It is a very easy thing to ask a man to undertake the duties of local secretary, but coupled as it is at the present moment in the country with the collection of subscriptions, it is a serious matter to ask a man like Mr. Benger to undertake to be a local secretary for Manchester. I am not sure myself that the collection of subscriptions by local secretaries is an advantageous part of their duty. I think I should be disposed to leave the collection of subscriptions to the Secretary and Registrar. Let him be the dun, and let him be as much abused as you like, but leave the local secretary to go about talking to his neighbours. Have enough of them in large towns to be able to do that easily, and let them go round from time to time and see friends. If they can manage to get a subscription for the Benevolent Fund at the same time, so much the better, but I do think a large part of the unpopularity of the Society in large towns is due to the fact that the local secretary is looked upon as a person who comes to dun rather than to consult his neighbours. I need not say that the main object of all these officers, gentlemen, is to keep our circulation warm in London. We want, of course, for all purposes, legislative and otherwise, to be in touch with all our members, and I believe that there are a great many men in large towns, not necessarily elderly men, but a certain number of young men, who would be very glad to be associated with the existing local secretaries in those large places where assistance is required, either under the denomination of local secretary or divisional secretary. I may remind you that I and my colleagues had the honour of receiving a private visit from all the London Divisional Secretaries about five weeks ago, and that we talked over matters with them with regard to pharmacy, and various other questions about the policy of the action of these divisional secretaries; what they should do and how they should set to work, and our results were extremely satisfactory. I think also the Council received a certain amount of information, and I hope the divisional secretaries themselves received information which was useful to them in their work. I have referred to the Benevolent Fund in dealing with the finances, and I need not refer more to it than is mentioned in this paragraph. As I have said before, we do not expect that our members should contribute large sums annually to this fund, but we do hope that everyone will give something, if only a small sum, annually. As I said before, the subscribers to the Benevolent Fund are the guarantors of a very large portion of the annuities, and it is desirable not only that we should be able to keep up our annuities, but that we should be able to give every now and then in certain cases—in the case of death—substantial relief. I do not want to shock you about amounts, but after all, when a chemist and druggist dies at the age of fifty-five or fifty, or sometimes younger than that, if he dies suddenly and leaves a widow and five children, and we can only give them £10—what is it? It is a mere bagatelle. There are cases where, if we could give £20 or £25, or even £50, it would save the widow and the whole family, and put them in a position to earn their living for the rest of their lives, but because we have not enough money, we have to dole out our grants in this slightly parsimonious way. I think I have shown before that in giving relief in a large number of cases, we cannot afford to give quite enough in the cases that come before us. The vacancies in the Council, gentlemen, which were caused by the retirement of Mr. Baildon and Mr. Symes respectively, have been filled up, as you know. Mr. Baildon's place has been filled up by the election of Mr. Watt, of Haddington, and a most active and useful member of the Council he is. He takes a great interest in matters pharmaceutical, and he will, I think, be an acquisition in future, as he has been in the past, if he is re-elected to the Council. The successor of Mr. Symes I am glad to see here to-day in the person of Mr. John Harrison, of Sunderland. In a certain sense Mr. Harrison is the first chemist and druggist member of the Council—in a certain sense, I think, one might so call him. I do not want to hurt his feelings by talking about chemists and druggists, because I think it is a great shame he did not become a pharmaceutical chemist. Although Mr. Cornelius Hanbury was classed as a chemist and druggist he did not in reality properly belong to that register, but being registered as a medical man he was obliged to be taken off the register of pharmaceutical chemists, and so, although he appeared as a chemist and druggist, he was not strictly in the same class. If there is any advantage in having a champion of the rights of any section of the Society, I hope there is not, but if there is, Mr. Harrison will do the work for them I think extremely well, and I have no doubt whatever that Mr. Harrison will tell his fellow chemist and druggist members what I have had to say before, that there is no difference in the interest anyone of us takes in the affairs of the Society; that there are no parties in the Council at all; that we are not a House of Commons with divergent views; that our object is to meet together as twenty-one men of business to do the executive work of the Society, and that we all agree very much, though the journals tell us that we ought to disagree in order to give them more pabulum for their pages. Of course it is very interesting to have differences of opinion, and long reports, but that is no part of our business at all. Our business is executive, to carry out the duties imposed upon us, and I hope that will be understood by our members. I may say appropriately on this occasion, in case I have not the opportunity another year as a member of the Council, that I do lament that some of our young friends who are anxious to be members of the Council find it necessary to make references to what they think ought to be done, and what they would do if elected, without ascertaining whether the Council into which they wish to be elected has power to do the things they want. If they would consider before they issue their addresses, or would get somebody who knows something about the matter to advise them, I think they would find it an advantage, because it is a little unfortunate sometimes for one of the younger members of the Society to be elected on the Council and to find it is absolutely impossible to move in the direction in which he said he was going to move—that is to say, that there are no powers which the Council can exercise to carry out the wishes of the candidate. I think that should be borne in mind. Of course the abolition of some law, the abolition of a big tax, we are all at liberty to go for. That may not be considered a very big thing, but some of these things are big when, for instance, you propose to ask the Chancellor of the Exchequer to wipe off a large income by the abolition of a particular tax. But

it is not wise in addresses to undertake to do things which, as a Council, we have no power to do at all. Well, gentlemen, to the illustrious roll of honorable members we have added the names of Professor Burdon Sanderson, of Oxford, and Mr. William Crookes. You know so much about these gentlemen, all of you who have followed their work, that I am sure you will endorse the action of the Council. Some of you may think this a small matter; it is not trade, it is not business. I should be very sorry to put it on a business basis, this question or any other connected with this great Society; but if you will put it on business lines, I do think that to have a man worthy of that illustrious roll associated with us is distinctly a business advantage to the Society, and that which is a business advantage to the Society in its corporate capacity, is an advantage to every individual member of it. The obituary list is, I am sorry to say, longer than usual. It includes the names of two honorary members, one of whom is Dr. Greenhow, and it also includes the name of one of my immediate predecessors in the chair, our late friend John Williams. We have not said very much about Mr. John Williams in this report, because he was personally so very well known to all of us. Apart from his many attainments and his many-sidedness, what above all things impressed us with respect to him was his geniality, his liberality, and his consideration in all matters, and above all his firmness in upholding the high standing of dealing in every department of pharmacy. I consider his death is a distinct loss. Mr. Williams was comparatively a young man, and I had hoped that with care he might have lived in a sort of dignified retirement, associating himself with some of the research work, which is now going on in the research laboratory, in which he took so great an interest. I hoped he would have been spared for many years to take part in that. It was a great grief to me personally, as to all of you, to find that he succumbed only a few months after his final retirement from active work in Hatton Garden. Another old friend of the Society, Frederick Barron, departed at a good ripe age, it is true, but he was relatively a young man and a very active man. Mr. Barron was a great friend to this Society. He was one of those men who, when he did not understand what the object of any particular suggestion was, always took the advice of those who did, and had it explained to him, and if he approved of what was going to be done, he was ready to give not only his time, but to freely open his purse, and generously give to every good work. He was a generous benefactor to the Benevolent Fund, and I know, and some of my old friends round me know more than I do, that in a great many personal cases of distress, occurring during the last twenty-five years, many a man has been placed on his legs and started in life again by the generosity of Mr. Frederick Barron. The name of Mr. Barron reminds me of a story which I believe is true. I believe Mr. Barron's father, who was, as you know, the founder of the firm of Barron, Harveys and Co., in what are called the good old days used to travel in a coach and four with his specimens right through the country, and I believe I am right in saying that he entered the towns blowing his trumpet, and drew up in a magnificent way at the principal hotel of the town, inviting all the chemists and druggists to come and dine with him, and then proceeded to business. I believe Frederick Barron, who was always called "young Fred Barron," although he did not travel in a coach and four, had in his early days much of the tact of his father who preceded him. Amongst the other losses we have sustained are the deaths of several members of the Society who filled the office of Local Secretary, all of whom we deplore, but I could not refrain from referring specially to the loss of our late President, Mr. John Williams, and of Mr. Frederick Barron, two men in very different walks of life. Mr. Frederick Barron was not a man of science in the slightest degree; he did not know a bit about science. He was brought up, as he used to say, to the drug trade; but having no knowledge of science, he was sufficiently keen to know and to say that the best qualification for a chemist and druggist in these days was to educate him and make him stronger than he himself was in his earlier days. And I think that is the best testimony we can have to the process which we are endeavouring to carry on in our institution. I beg to apologise for these wearisome remarks, but it seemed to me proper that I should say something out of respect to you, though I have no doubt you know quite as much about this report as I do myself. Allow me in conclusion to say that there are one or two other matters about which I might say something, but as they will be brought before the meeting on special motions I do not think it is necessary to refer to them now, so I will postpone any observations I may have to make on the two motions of which notice has been given until the proposers have put their propositions before you. I now beg to move that the annual report and financial statement submitted by the Council, be received and adopted.

The VICE-PRESIDENT: In rising to support the motion so comprehensively moved by our worthy and respected President, I feel that he has so fully entered into all the matters appertaining to it, that there is little left for me to say without reiteration of what he has said in very much better terms than I can command. But there is one part of his remarks in which I differ from him, and I take respectful exception to it. That is when he spoke of his friend the Vice-President as one of the fossil Conservatives who were afraid of the movement for electing annuitants on the annual income of the Society. So far as my recollection is concerned, he is very much at sea there. It is a small matter, and I would not care to refer to it, but I am afraid that if he repeated it again in my hearing I should fancy it is true. So far as the election of annuitants on the annual income of the Society is concerned, I was one of the pioneers of that movement, and up to this moment I have been exceedingly satisfied with the progress and result of it. The only one thing which I have had cause to regret is that the policy has not received so much support as I then expected from one source, the small subscriptions from a far larger number of subscribers. On that point I have been disappointed. Outside that, the movement has been in every way satisfactory to me, and I believe it has been to every member of the Society.

The PRESIDENT having stated that the report was now open to discussion,—

Mr. PERCY WELLS said: I rise to ask whether it is necessary or expedient that we should cumber the Journal occasionally, or from time to time, with the proceedings of the Pharmaceutical Society, I believe it is called, of Ireland? They are certainly not edifying, as far as I have ever read them, and I have wearied myself very frequently by perusing them. I find them nothing but a record of disagreements, and frequently of rows, and I submit that the object and purpose of the *Pharmaceutical Journal* was not to record such things. If you are under any agreement with the Pharmaceutical Society of Ireland to insert those things, I have nothing more to say, but I submit, sir, that if you are the quicker such an agreement is put an end to the better. I was very sorry indeed in the lengthened remarks you have made to day to hear you say that this Society was not established on a business basis, or anything else belonging to the Society. It bears out unfortunately the opinion which but too many chemists entertain outside the Society, that the whole and

sole object which you consider you are elected for is for the purpose of education. I do not dispute or join issue with you as to the benefits resulting from education, because I believe the more you educate, up to a certain point, if you please, the chemist, the more you will make him respected by his fellow men; whether that will bring money into his pocket, is another question, but I quite agree with you that you seem utterly to ignore the business point of the question. I do not say this with any idea of opposing you, or with any aggressive feeling, but it is an opinion which I have entertained for I am am sorry to say a very great number of years; and I do not stand alone in it, because if you were to be judged by your actions you stand condemned, especially after what you have given utterance to to-day. It is very true that we have only an opportunity once a year of coming here and having a good growl, or, as I have no doubt some of you would say, "baiting you a little," but unless we do that, trifling as is its effect, I am afraid some of you would be a great deal worse. Unfortunately, from the result of my observations, whether I am right or not I cannot say, I only judge of you by results, and by your actions. No sooner do you get under the shadow of the Council than you all appear to be atrophied, as far as your desire to further the interests of the trade is concerned. I draw a distinction between trade and education. That you are trying to benefit the chemist by education I do not deny, but that you try to benefit his trade, I unhesitatingly say I have not seen one single action of yours which leads me to that conclusion. Now, sir, there is another point. I want to know—and my wants will not be many on this occasion—why you do not, as you have been asked to do over and over again, put the postage of the Journal with the expenses of the Journal, so that we shall not have to look in two places, and add up the cost of the Journal and the postage, from which we have to deduct the income from the Journal. It would be a much fairer and more straightforward way to put it altogether, and you have been asked to do it over and over again, and I wonder you do not do it. I suppose it is because there is a deadly nightshade over you that you will not progress at all. You congratulate the Society on the larger number of candidates for examination. I say, sir, that it is a matter not for congratulation, but it is a matter, as I have said before in this room many years ago, sincerely to be deplored, as it is simply adding to the list of those who have a very great difficulty in getting a livelihood.

The PRESIDENT: I do not think I said it was a matter of congratulation.

Mr. HOWARD HALL: I take it Mr. Wells is attacking the Council, not you personally.

The PRESIDENT: I did not say it was matter for congratulation.

Mr. WELLS: I am not attacking the Council or the President. I am simply attempting in my feeble way to give them a little good advice.

The PRESIDENT: What I want to impress upon you, Mr. Wells, is that I have a doubt whether I could congratulate the candidates or the trade, and I do not think I did either.

Mr. WELLS: At present, sir, my hearing is comparatively good, and I submit, with all respect to you, that you did put it in the way of congratulation.

The PRESIDENT: As an increase of income, that is all.

Mr. WELLS: We will not quarrel about it; at all events you mentioned the subject as if it was one for congratulation. In conclusion, may I beg, in the interests of the whole body of chemists, that you will descend from the great height to which you have elevated yourselves, and endeavour, if you can, to bring your minds to mundane thoughts a little; endeavour if you possibly can to exert all the ingenuity and ability which I give you credit for possessing to see if you cannot benefit the trade. You cannot, unfortunately, benefit it by the introduction of what is called protection. But when I consider that other professions do receive a certain amount of protection from the State, and we stand out—it has been entirely our own fault, I am sorry to say—but still at the same time I have no doubt that where intellect is brought to bear to damage us, a corresponding amount of intellect ought to be brought to bear by those who are the rulers of the Society to endeavour to counteract it and defeat it. With these remarks I commend what I have said to your serious consideration.

Mr. LOMAS: I want to refer to one very important question, and that is as to the outside members who do not come into this Society. You said you were sorry that the fees, that guineas, did not come in as fast as you could desire, and that you thought it would be advisable, even if they paid nothing, to have them in. Now unless you and your colleagues move in this matter, you will not get them to come in. Of course, I merely throw out the suggestion, but would it not be desirable to reduce the fee from one guinea to 10*s*. 6*d*., and if you deemed that advisable, to send out circulars, postage-paid both ways, asking the opinion of the trade. Of course you would send the circular with any remarks you chose to make, asking if they are willing, if the fee is reduced, to join the Society, as you think it is very desirable; and I certainly think it is the most important question of any which can be brought before the Society—more important than the Benevolent Fund, or anything else. Union is strength, and it does seem to me that you do not think so much about it as you ought to. There is no doubt about it, you must try to get those outside members in, and you will not do that unless you move in the matter. Of course I know that your head is far superior to mine in these matters, but still we only come here once a year, and if we come to the meeting and do not say anything, we might as well stay away.

Mr. URWICK: I must say I agree with the remarks which have fallen from the last speaker. We have been gradually losing members; we have lost several this last year, and I think it would be a great thing if we could come to some arrangement as to broadening our basis and increasing the numbers of supporters of the Pharmaceutical Society. I know the evil which has been caused—I was opposed to it—by that Act which was despoiled of all its merits. We have been thrown back, and have not gone forward, as we hoped, but still there ought to be an effort made to increase the numbers that belong to the Society and have the powers connected with numbers. You would have a broader base to work upon; you would know more of the interests of the trade at large, and you would bring an intelligent number of men about you who would give you their ideas and their views as to the trade, and I think we should rest on a larger and more popular basis than we do at the present time, and, therefore, I quite sympathise with those views. With regard to the postage, there seems to me something very defective in the Register, for I have circulars come to me for assistants who have left me for years; some have gone into business, and some are dead, and their deaths have been recorded in the Journal, and yet circulars still come from the Society itself as well as from numerous advertisers. When you issue a Journal for advertising purposes it always comes, and if the same thing is done to one half the pharmaceutical chemists as is done to me, the postage must be a considerable item of waste. I do not know how it arises, but another strange thing is that the circulars for men who are dead and gone generally come to me before my own, although my name in the alphabet stands before theirs. I thought I would not encumber myself with the Journals that have come, but have brought three circulars which were sent to me in this way.

A MEMBER: It is a psychological phenomenon peculiar to the Society.

The PRESIDENT: Do they come from this house?

Mr. URWICK: Some from Churchill's, and from other people who advertise, and I have the same names repeated, which shows there is something defective; these men did not die last year, some have been dead a dozen years.

Mr. BUTT: If Mr. Urwick would return the letters and circulars we should know they were dead.

Mr. URWICK: It is no business of mine. I think the Society ought to do that. As I am on my feet I should like to say a word about the vivisectionists or anti-vivisectionists. I do not profess to be either one or the other, but I do think it is a pity that such men as we have as honorary members should be attacked on that basis. So strongly did I feel that I thought I should only have three members of the Council to vote for, that was yourself, Mr. Butt, and Mr. Newsholme, men whom I considered had stood out well, but that all the others who had been on the Committee in the research laboratory and had taken a part in it, had recanted and been nominated by the twenty-eight gentlemen. I felt myself considerably puzzled. I was annoyed at members not having the courage to come forward themselves and speak their own views here, but that they should join those outside and create a division in our counsels was I thought past bearing. Before men take such steps they should consider their own position; let them take the beam out of their own eye before attempting to take the mote out of ours. I can conceive no chemist or any other man coming here with boots on his feet or gloves on his hands who could speak against the vivisectionists, nor could I imagine men going feasting and rejoicing over roast beef and roast fowl and being opposed to vivisection. I think their objections, if they have any of the kind, should begin at home; they should become vegetarians, though I do not know that would save them, for I am afraid many a poor horse gets a very severe crack of the whip to make him plough the ground to produce the wheat and flour that we use. If we carry arguments to these extremes I do not know how we are to exist. I do believe that vivisection should be practised merely with the object of doing good to our fellow creatures and for relieving pain; but in that light I believe it is justifiable, in spite of all that is stated against it. I may be alone in this, for people are so carried away at the present day by the sentiment that you must not cause pain, that I may perhaps be scoffed at; but those are my feelings, that if you can benefit humanity it is legitimate to carry out those researches in as merciful a way as you possibly can. I say those twenty-eight gentlemen have no right to come here and denounce experiments which have the object of relieving pain and suffering. I cannot sit down without expressing my regret at the loss the Society has sustained, and chemistry also, in the death of Mr. John Williams. I think no member of the Council deserved our respect more. He stands forth as an example of what a young man can accomplish. He was one of the early comers into the trade when education was not so good as it is at present, but he pushed himself by force of character and diligence to the forefront in science as a chemist, and we have sustained a very great loss in his death.

Mr. WARREN: As a friendly critic, being one of those who have been calling on some of our fellow pharmacists with the object of getting them to support us in this matter of education, I think I should like to give some of the results of my visits to the Council and the meeting. I found universally, or nearly so, a very great indifference, I am sorry to say, and to anyone who goes into mere education they say it is of very little use to starving people; though perhaps it is not put quite so bad as that. They suggest that we are making an Eiffel tower, while the ground is not supplied with bread and cheese. The Society has not the power, the President says, to take any steps to remove the grievances with which we are weighted, but we all confess the difficulty that our defences are broken down. We do not mind facing the stores, but can we stand on the ground open to us? We know we cannot go back to the old days of protection, and our only hope now is by personal effort. A body with a soul in it is better than a body without a soul, and perhaps in the end, although it will be a long time first, the public will come to appreciate personal effort over simply working by percentages, and see that the hired people who can have no possible interest in the public and in their duty, are very different from the men who have brought the Society to its present condition—men like Deane, Hanbury, Jacob Bell, and the men who adorn the Society to-day. But while we are open to this competition, is it fair that we should have our legs and hands tied by irritating and wearying restrictions such as the Patent Medicine Act, which is being enforced, as we all know, with excessive diligence. We heard last night only that the Council has given considerable attention to these things, but unfortunately the members at large do not know sufficiently of the light that is burning at Bloomsbury Square. I think it would relieve all those you may trust with any duty connected with furthering its work, if by any possible means we could have all the good work they do made more manifest. It is very little known that attention is given to these subjects, and I think it would assist us considerably. Sometimes you fear that whilst attending to these common duties of life the dignity of the Society may be somewhat lowered, but even if it loses a trifle in dignity it gains immensely in vitality. I always think Mahomet was a wise man in going to the mountain, and I think it is the business of the Society to try and win men to it. It is a very hard thing, speaking from my experience, in visiting men, to see them day by day struggling against all those restrictions, and the only hope held out is for the future generation of chemists which the unborn education Bill will supply us with. The scientific evening meetings are very nice and very informing, but could we not have a certain number of evening meetings each year in which subjects of general interest might be discussed over a friendly cup of coffee, and, perhaps a pipe of tobacco might not be objectionable. Pharmaceutists have the character of being narrow-minded very often, but is it not through the want of bringing them together more in that way. We have this building here, and I believe if more social efforts were made the affection of the members in various parts would be attracted towards it, and if you once got that you would have the impetus that a united body and a large following would give you to push on your higher aims. The President said in another place that he would not lend himself to any object which had other than the public good for its end; that a corporate body could not lend itself to such an object; that our own good must be indirect; and yet I think there is no reason why we should remain as a common target to be bear-baited by Somerset House, by incompetent magistrates, and goodness knows who. I would have every chemist look on the Society as a parent, and feel that if he were unjustly accused, the Society with all its influence would come to his rescue, or give him advice; that we should look up to the Society in all matters as a parent Society, and with affection. I think the idea has been suggested of bringing the local secretaries throughout the kingdom together once or twice a year, and I should think that would be a very good thing. The Council would be brought through these means into communion with the members throughout the country, and thus get the representative ideas of the whole community.

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Even if there were not a formal discussion there might be an interchange of ideas. Anyone who has taken any interest in the Society and wished to see it strengthened, cannot but be discouraged by the prevailing apathy, and I cannot help thinking that unless there is some reform in this direction, bringing the whole body more together, increasing its vitality, and doing work which will supply bread and cheese as well as higher culture, the Society will lapse for want of sufficient sustenance.

Mr. SANDELL: I quite agree with what Mr. Warren says. We have now appointed divisional secretaries for London. I think it is the commencement of a course that ought to be more fully carried out. I would also suggest that meetings should be held, say once a month, and not only divisional secretaries should be asked to attend, but any other chemists who would like to come also. What we want is to pull together more. We seem to be such a disunited body, and there is a reason for it. It is a great deal through ignorance, immense ignorance. I have been appointed one of these divisional secretaries, and have visited two or three of my neighbours, and I say that a great deal of this antagonism to the Society arises from ignorance. If we were to meet more often to talk these matters over, there are many things that do not come before the Council which would give them ideas, and I am sure it would do an immense deal of good. There is no doubt if we could get the local secretaries from all parts of the country to come twice a year it would be a great help, and there is no knowing but that some genius might arise amongst all these men meeting together that might help us out of the difficulties that we are now labouring under. I certainly put this view before the Council. I think the oftener we meet the better it will be for the Society.

Mr. BLAND: This assembly is looked upon by some of us as a sort of annual Parliament, wherein we have a right to ventilate our grievances as well as provide the supplies. I must acknowledge that Mr. Wells said a great deal with which I entirely sympathise. I am not going to say that I endorse the scolding which he ventured to administer to the President and to the Council in general, but I must say that I cannot disapprove of his text, although I cannot quite endorse his sermon. Whatever the Council may believe, and however little division there may be amongst its members, and you have told us there are no parties amongst them, still it is the fact that a large number of pharmaceutical chemists, as well as chemists and druggists, say, to use your own expression, that the Council is not in touch with the trade. I have heard that opinion expressed in so many different quarters that I cannot but believe it is a settled opinion amongst great numbers of our brethren. Mr. Warren said we are on all sides hampered and tortured by various public bodies. We are, to a certain extent, under the dominion of the Medical Council, and the Commissioners of Inland Revenue, and the Board of Trade, and I know not what other public officers, and I think it is quite time that we made an effort, at all events, to show these different bodies that they are not to have it all their own way. One of the grievances, which has been called a burning grievance, although I myself am not particularly affected by it, is the present state of the patent medicine law. I am not one of those who sympathise with the indiscriminate abuse levelled against all proprietary medicines. I believe that some of them are useful and valuable and quite as much entitled to a place in the apparatus medicandi of the prescriber as any preparations in the Pharmacopœia. I think we have a just right to complain of the state of the law and of the Commissioners expression of the law which at present prevails. As I have had occasion to say once before in this place, what we complain of, and what lies at the root of the whole matter is this. The Commissioners of Inland Revenue are not only the executive of the law, but they are actually to an indefinite extent the legislators; they make the law as well as administer it. The Acts of Parliament themselves are very difficult to comprehend, and I suppose as a partial remedy Mr. Alpe's book has been published. I think we have every reason to look upon it as an authoritative expression of the actual practice of the Commissioners. I have read carefully Mr. Alpe's book, and I tell you plainly that I rose from it with the impression that it made confusion worse confounded. There are inconsistencies and contradictions in that book which render it a very unsafe guide to persons actually engaged in the sale of such medicines. You know there are certain qualifications which lie at the root of the whole matter. There may be six, or eight, or nine, or ten, as Mr. Alpe says. If a medicine is supposed to come under any one of those descriptions, it is liable to the stamp duty, and Mr. Alpe generally says in his book the use of the disjunctive "or" signifies that any one of these qualifications makes a medicine liable to stamp duty. If that were really the intention of the Act, what is the reason that, from the time the Acts were passed to the present day, it has never been strictly carried out? Within the range of at least two or more of these qualifications, the Commissioners have never enforced the Act of Parliament strictly. The practice of the Commissioners is a process of evolution. It has been said that they have lately discovered that they have not been administering the law strictly enough, and they have brought lots of articles within its range which they did not previously. It is quite evident to anyone who reads the Act that there are unexhausted potentialities still, and that they will soon be giving the screw another turn, and then another, and by-and-bye there will not be a chemist and druggist in London who will not be liable to prosecution and fine for infringing it. There is a general impression amongst people that there is a tendency in the Council to press the matter of education too far. We do not want to manufacture razors to chop up firewood. I have always been against the curriculum that is proposed, and I cannot see how any man can possibly endorse it. There are about thirty subjects mentioned in that curriculum, some of which occupy the whole of the time of the greatest men of the day, and yet you undertake to teach a young man to travel through the whole course in ten months. Why, sir, if you gave him ten years, or twenty, you could not teach him what is comprehended in the curriculum. That leads me to suppose that whatever teaching he may get under the curriculum will be necessarily of a superficial and imperfect character. I did not come here with the intention of opening my mouth, but these two matters appeared to me worthy of being placed under the consideration of the meeting. I think it is time to attack the practice of the Inland Revenue Commissioners. We are all under a great indebtedness to Mr. Lamplough, who had the courage and the means to fight out that matter with them. In my judgment, we do not want anything to do with the Inland Revenue commissioners; I would not go to them at all. It has been whispered to me that it is a bad thing for our Council to go to any of the public departmental bodies, because the Council is very apt to get demoralised. I think it would not be a difficult thing to stir up the whole body of the trade to petition Parliament and co-operate on their own part, and to do, if necessary, a little lobbying in the House of Commons. I can remember an occasion when a comparatively small number of individuals in the Society, who

thought the Council was not properly representing their interests, just took these simple means, and a member of the then Government said that in all his experience he had never known so powerful an opposition raised by so small a body in so short a time. The result was that the measure then before Parliament which that small body of men opposed was within a few days withdrawn.

Mr. GILES: Will you allow me to call attention to a small matter which of course I wished to defer until these larger questions had been talked about. It relates to the accounts. I confess I have not been in the habit of looking at these accounts, and I should not have done so this year but for the first passage in the report, which informs us that there has been a deficiency in the receipts as compared with the expenditure, of some £120, I think it is. I then looked at the accounts to see whether it was so, but I really cannot make out that there is any such deficiency. It appears to me that the receipts exceed the expenditure by £410, if you knock off the balance brought in, and the balance carried out, and that if you then knocked off what I should consider the balance of capital expenditure which might be considered not properly to belong to the account there will still remain a balance to the credit of income of £113. I simply mention that as the matter which called my attention to it. The point I desire to call the attention of the Council to is this: Cannot the accounts be put in the customary form? This is I do think the most unbusinesslike thing I ever saw. It is not an account; it is called a financial statement. But what a financial statement means I do not know; I suppose the Council does, and I suppose this is it. It is not an annual account which is valuable. It does not give you any information what your assets and liabilities are, which is the most important thing in this company—I mean this Society. If this were a company which earned profits and divided dividends then I could understand that this account is the essentially important one, but it is not—(oh!)—stop a moment, I think you must have misunderstood me. If this were a company earning dividends then the important account is the revenue account for the year, because that is what your dividends come from, but inasmuch as the only value of this account is as to what the result is on the capital account, at least it is very important that you should have the capital account each year. I propose to suggest that the auditors should be invited to discuss this question with the Council, with the view to consider whether in future they would not agree to publish the customary form of account under the several heads of the annual account of income and expenditure for the year, a capital account, and a general balance sheet. It appears to me it would cause no trouble, and it would be very much more intelligible, whereas this appears to me to convey no information worth having. Do you think, sir, it would be sufficient to leave the matter there with that suggestion?

The PRESIDENT: I think when you hear my answer you will be satisfied. It is quite open to you to move, and on a matter of that sort the Council will be glad to do what the members wish as far as its powers will allow it.

Mr. GILES: I have not come to talk about this without first seeing whether I could arrive at a satisfactory understanding with the Secretary, and what I understand from him is this, that when a more correct form of account has been published the members have not understood it. I admit that my experience of affairs and accounts leads me to the conclusion that as a rule there is nothing so little understood even by men of business as accounts; but I think it is a very bad plan to leave your Society in that slough, and if you can help them out by putting before them a different form of accounts it might even help them in their own private affairs.

Mr. HAMPSON: I am perhaps a little irregular in venturing to speak to-day on any subject, but inasmuch as reference has been made to the action of a certain society outside this building I cannot remain perfectly silent. I refer to the action taken by a society called the Anti-Vivisection Society, and I simply wish to enter my protest against the action which has been taken. It appears to me that a Society professing to do justice and right in certain matters should at any rate approach this subject in a very different way. To endeavour, as it were, to get a certain number of our members to take direct action in the crisis of an election in the most unfair and unjustifiable manner is a shameful abuse of power and of money, and I cannot help stating that. They have not only done it in this way, but they have done it in such a stupid way that it must call upon them the rebuke even of their own Committee when this matter is brought to their attention. I am quite sure that whatever the views of the Council or of the Society may be on this question there are certain members of the Executive Committee who carry on the work of opposing vivisection who would scorn to do a mean thing, and it is only necessary that they should be made acquainted with the absurd and stupid way in which the operations of this Society have been interfered with.

Mr. N. H. MARTIN: I will not detain the meeting more than a few seconds, but I am not so old in years and I am too young on the Council not to welcome from any source any instruction that may be given to me. Therefore, when the first speaker, and one or two who followed him, said their object was to give instruction to the Council, I listened with great attention to the remarks they made. I was, however, surprised that the first speaker should have said that education was not a mundane thing, that we in this building and the Council were concerned to educate, but that it had nothing whatever to do with the concerns of this life. That is what I gathered from his remarks. With reference to that I should like to ask, as a practical question, what is the view of the men who have gone through this school, whether in their experience it had not been mundane enough to be converted into bread and cheese? Mr. Bland referred to the syllabus and said it was impossible in ten months to cover the syllabus. If we had a course which extended over ten years we might be accused of going in for higher education, but a course which simply gives men a scientific training, and gives them the ground work of the principles on which their business is based, has no right to be classed as not a mundane thing, for I can assure you in the history of hundreds of men it has been converted by them into bread and cheese. Another speaker has alluded to the fact that union is strength. I think he simply made a slight mistake, perhaps, in applying it to this meeting; but it should be reported so that every chemist and druggist on the register may read, mark, learn, and inwardly digest that fact. I submit to the meeting that it is for the individual members and chemists and druggists who are not connected with the Society to consider that point, that union is strength. We have been reminded that in 1865, I think it was, it was disunion which upset an Act of Parliament which would have given us the strength which would have been valuable. Is it not, and has it not been disunion from that day to this which has tied the hands of the Council and rendered this Society so impotent for good as it has been? I submit that it is, and I would recommend the maxim that union is strength to the individual consideration of each chemist and druggist in this kingdom at the present moment. I do not think I need detain the meeting longer; those are the two points I should like to have emphasized.

Mr. GUYER: Mr. President, when I entered the meeting I had no intention of opening my mouth, but I may be pardoned for saying a few words. I feel, and I am sure we all do, much indebted to you for the explanation you gave us. I have listened to many chairmen's opening remarks, but I have never heard a statement before that I considered so completely business-like and lucid as yours, without a lot of emotional words about this or that; there was not a word too much or too little. I want just to ask you, sir, and some of the gentlemen on the Council, your advice as regards pupilage. The Pharmaceutical Society, I maintain, was started originally to promote the higher intellectual education and knowledge of the chemist; that was the primary object, but with that also I cordially admit that the business advantages were always to be kept in view. We have talked a great deal about being handicapped in business, and that we have a great many things to our disadvantage. So has every other business. We are all very heavily handicapped in these days. The strife is very keen. But I think twenty-five years ago this Society had an opportunity and let it go by. At the very first time when the stores were started it was in our power to have taken steps which would at once have put us and the stores on an entirely different footing. The opportunity was lost, and now we may complain for the next five hundred years, but we shall never be able to remedy what is past. Competition in trade is great, and all that we have to do is to face, and make the best of it that we can. With regard to education some say your standard is too high and some want it lowered; that I must leave to the Council, but I feel, looking at the question of examinations for both the Minor and the Major, that any young man who will come up to the Pharmaceutical Laboratory and give six or ten months here will be able to pass it, and not one per cent. of those who would give six, eight or ten months for study would be rejected. If a young man will come up merely for two or three months' cramming, what other result can anyone expect. Now, about pupilage, it is very difficult in these days to know what to do as regards apprentices. When I was apprenticed, which is a great many years ago now, it was to one of the very largest firms out of London, Messrs Randall and Son, who in those days took five or six apprentices, and had four or five assistants, so that there were twelve or thirteen always in the house. Now at the present day times have so changed that they would not take an apprentice, and I do not suppose that any house in Bond Street would think of it; and I do not believe the representatives of that respected firm, J. Bell and Co., the founders of the Society, would take one. They say, "No; go and get your knowledge elsewhere; do not come here. We only take qualified men." What are all the chemists and druggists throughout the kingdom to do? Are they to have a kind of bar sinister put upon their names as professional men because they take pupils, and are the young lads of the present day to be thrown only into country and agricultural towns, where perhaps they never see a prescription once a month, and where they have very little training at all in some of the higher branches of chemistry? If some of the large firms would only turn that over, and say what is to be done, or allow some of our sons to be apprenticed to them—I should be very happy to bind my son to Mr. Carteighe to give a few years' training—we should be very glad. But what are all these young men to do? You blame them because they come up from small towns, and are ignorant, knowing nothing of the business, but where they would have a chance of better knowledge they are rejected. I know you have plenty to think about, but this is an extra topic for you to consider. One word, or rather two more, and I will not detain the meeting any longer. About the Patent Medicine Act. I very much doubt myself if the Patent Medicine Act were entirely done away with whether there would be any benefit by it; you would only throw open the right of selling and compounding to every huckster and grocer throughout the kingdom. My own feeling would be instead of taking off the patent medicine stamp duty to double or treble it. It would bring a better income into the Exchequer, and prevent a lot of these spurious medicaments flying broadcast all over the country. Then with regard to the election. I am very sorry to see what has taken place, but I am quite sure the best men will be elected. I was very much surprised last week to have two ladies come into my place of business at Torquay, and ask me and my partner to vote for the names of certain gentlemen on this list. I did not even know their names, and when I saw it and saw the answers from these gentlemen in the Journal, I said I should not vote at all for the first time.

A MEMBER: I came here to support the motion concerning the patent medicines—

The PRESIDENT: I think it would be convenient that the patent medicine question should be postponed until Mr. Nicholl's resolution is before us, as it does not arise directly out of the report. If that be the wish of the meeting, perhaps they will allow me to reply to the observations which have been made, which I will do very briefly, if I can. Mr. Wells is too formidable an antagonist to be ignored. He talks extremely well, and his views are broad on most things. With regard to the proceedings of the Pharmaceutical Society of Ireland, I may say at once that the Council of that Society wished us to deliver our Journal to its members, and on the grounds of friendship and association, and the general advancement of pharmacy, we thought it was a right thing to do. I do not wish to say anything disrespectful to the Pharmaceutical Society of Ireland, but we all know the Society is not very well off, and this Council thought that it would be fulfilling your wishes if we distributed the Journal to all its members at, roughly speaking, the nett cost price; and obviously we could not do otherwise than report its proceedings. It must be remembered also that those proceedings affect a certain number of our own licentiates who are in Ireland. An assistant in Dublin cannot open a shop there unless he is qualified under the Irish Act, and you must also remember that in Belfast the great majority of the assistants are either English or Scotch; in fact the great work of dispensing in the North of Ireland is done by Englishmen and Scotchmen, not by Irishmen at all. The proprietors of the old businesses were primarily apothecaries and doctors of medicine, and we have a large number of our own body distributed throughout Ireland, and they are interested in anything which affects the possibility of their setting up in business in that part of the Kingdom. Mr. Wells says that gentlemen who come to the Council get atrophied; that means, I suppose, that they lose their backbone. They get atrophied, I am afraid, because they talk before getting on the Council of things they have not taken the trouble to understand. They imagine, in fact, that coming into the Council is like going into Parliament; you can say pretty well what you like to the English public and get elected, and then arrange accordingly afterwards. The Council of this Society and our members are not to be dealt with in that way, and I have no doubt that members elected in that way feel very much surprised now and then at what takes place. But really it is increased wisdom. One cannot object to men changing their opinions, but it only bears out what I said in the first instance, that when a young man wishes to become a member of the Council it is wise not to pro-

mise too much without knowing what can be done. If they did not do that they would not be atrophied. The postage of the Journal is a small matter, it is purely a question of detail; it is held to be a charge on the Society as a whole. The production of the Journal is a charge on the Journal itself. It is simply a matter of convenience, is perfectly sound, and is in accordance with the complete set of accounts which we have in the office upstairs for the guidance of the Council, made out in a way which is a perfectly sound financial way of dealing with it. The distribution of the Journal is a separate thing from its production, and is so charged. Mr. Wells, Mr. Lomas and some others have referred generally to the question of protection of trade, and that we do nothing for it. In the first place, as Mr. Martin has observed, it is assumed that education has nothing whatever to do with trade. Well, I have repeatedly said in this room, and I reiterate, the men who are most successful in pharmacy in this country are the men who have had the best education. They have turned their education into full value for every sixpence they have spent. There are such men in this room to-day; I am one of them, and many others who are absent. I do not regret one sixpence that was spent for me here. It is most shortsighted to suppose that education is not convertible into money. The question is, what is to be the future of the pharmacist if he is not to be educated? He will be swallowed up by the great concerns with enormous capital. If he cannot assert his individuality and prove he is something more than a mere huckster, people will say "I will go to the stores and be No. 1 of 5,000 customers," but if he has an intelligent and intellectual man to deal with, he will be content to pay him a fair remunerative price for his work. You are on the horns of a dilemma. You blame me, as President, for saying that I help to make pharmacy a profession; you say it is not a profession—it is a trade. Very well. I say I have no objection, let us consider the matter on whichever side you like. If it is to be a trade, you must deal on trade lines, throw your education over altogether, make yourself a grocer, and compete like everybody else. But if you want a good price for your goods, if you want a price for brains, time, intelligence, for the training, which is that of a professional man—you must deal with it on a professional basis. I say that you have not a leg to stand upon if you cannot put individual merit against great corporations and great companies. It is the only thing we have, and hard as it may be to look to the future, I believe that education and individual power will tell against these great corporations. Great corporations are like great hotels. Who cares to go into a big hotel with 300 or 400 persons in it, where you are No. 350 or something of that sort; everything is done in a machine sort of way, and you have to order everything you want a quarter of an hour before you want it? Who likes that sort of thing, even if it is cheap, compared with the advantage of going into a small hotel, where the landlord and probably his wife are ready to receive you and consider your personal comfort? Do you raise the question whether the price is 20*s*. a day or 25*s*.? Of course you do not. Why we druggists, poor as we are, do not, and there are a large number of people who have more money than we have who are quite ready to pay full value for intelligence, attention, integrity, and honour, and a man will never have any of these things unless he is fairly educated. So that I say every step we take in education is a direct advantage to the future pharmacist, if you like to call it so, in his trade. Now what have we done about trade? You say we do not protect trade, but how are you going to protect trade? There is only one thing for the protection of trade that the great majority of people in our own business who are not connected with the Society understand. They want us to draft a Bill, and go to Parliament, and try to persuade it to make "corporation" read in our Act of Parliament as though it were "person." Of course it is a very unfortunate thing that the interpretation put upon our Act has been such as it is, but we have to face the difficulty, and let us remember that we not only have to face it, but we have to consider what is the best thing to be done. You, gentlemen, who complain about the apathy of the Council in trade matters seem to be under the impression that we are a Parliament, that we are capable of making laws for your satisfaction. We are capable of drafting Bills, and placing them before the House of Commons to be scoffed at and sneered at, and probably, if we were like some people, we should do that from time to time to gratify a certain number of our members. We should just throw a Bill down into the House, containing all sorts of things which in our hearts we knew would not be received by any member of the House with consideration. Do not misunderstand me when I say I am not lacking in sympathy for yourselves, because I am in the same boat as you are, but I should be failing in my duty as President if I did not tell you the wholesome truth. You must have it and you shall have it, because I may not be here next year to talk to you, and therefore you had better have it to-day. I say that the Government has said distinctly that it does not consider that the public is damaged by corporation trading if the man who has charge of the pharmacy is a registered person; that is to say it does not require, what you would require, that all the members of the corporation should be qualified. I say that members of the House of Lords who have been our best friends in the past, who have gone into the subject with me repeatedly, and who did in former years with Mr. Sandford, have come to the same conclusion. They say we do not care at all who gets the profits of the pharmacy as long as the person in the pharmacy who has to hand over these dangerous poisons is a registered person. The public are safe, and we are not sure that the law is not—but if it is not it ought to be—that not only shall, in the ordinary case, the keeper of an open shop be qualified, but the person who hands over and dispenses the poison. I commend this to the attention of those who think you can absent yourselves from time to time for months together from your businesses regardless of the consequences. I tell you what certain law lords say with regard to that, and it remains to be seen, as time goes on, what interpretation will be placed on the law in that respect. But please to understand the protection of trade for you so far as it possibly can be conducted by the Council—or rather what is wished to be done—it is utterly hopeless for us to attempt. The House of Commons will not have it—our best friends in the House have told us so. They say just the same thing—why should not a man invest his money in any form of company he likes—what harm is it to the public? And, indeed, they say, is it not a decided benefit to the assistants? Why should not the men who have passed your examinations get decent salaries as assistants, instead of all the benefit going to the principal? Those are the arguments used to me when I am fighting your battles. I commend them to your notice. Whether they are good or bad we have to face them; we have never succeeded, nor can any corporation succeed, in getting any Bill passed unless we have a report of a select committee at our back that the provisions we put in our Bill are reasonable, or unless the Government itself or a Department does the same thing. Now with regard to our Bill before Parliament. The reason that we sent that Bill on purely educational lines and on none other to the House is that the Department of Government agrees with us heartily with regard to the

Bill, but it does not agree with us on certain other questions as to poisons, and it does not agree with the view that corporations should be prevented from selling poisons, nor does it agree with the proposition we have made that we are to be the dispensers of all prescriptions, as in Ireland. It is considered that the public safety is sufficiently guarded by what I have already mentioned; and a proposal to that effect is actually in their own Bill, which was actually brought into the House, namely, that stores should be recognized in this sense—that any company where poisons were sold or dispensed should have a qualified person in that store, and that his name should appear as the responsible person. Whether that is a good thing or not is an open question, but I commend that to Mr. Wells. There are some who think the uncertainty of the law as it is better than the making of the law more certain by a specific clause bearing upon the subject. I suggest that these are matters requiring close attention, a good deal of knowledge, and some judgment, and if I do not say anything more you may assume, if you please, that I have good reasons for not saying anything more. I must ask you to trust us as the members of every trade union trust their own elected body. You do not pay us for our services. You get up circulars every now and then, but you cannot get more than seventeen people to compete for fourteen seats. Where is your choice? Where does your President get his £1,000 a year from, as he would in any public company or in any company where he did the same amount of work? It is perfectly preposterous the way members talk about the Council, composed of gentlemen who come from all over the country to do the executive work of this great Society. They simply bait and bully, and in print insult and libel them. If it had not been that we have all became pachydermatous we should rebel. These statements are so strong that we have become pachydermatous. You do make us a little weaker in the back, or if you prefer it, so much stronger in the back, that when you do make what may be called a feasible proposition to us we begin to be shy and think it is another dig. But I do submit that to you, gentlemen, it must be put plainly. It is a great honour for us to be on your Council. It is an honour for any man to be selected by his colleagues, in any calling, to represent the bulk of that calling monthly at its meetings, and to do its work. But there is something to be said on the other side. Do you not think that some of us reflect credit on that Council of which we are members? and do you think that the time and labour we devote to your service is to be accounted as nothing? We do not ask you for rewards, but for fair consideration, and for something like judgment when you write letters and talk about voting for men who will do this, that, and the other. You cannot get the men. It is nothing more than the loyalty and energy of a small number of men that keeps this great machine going. The work of the Pharmaceutical Society, and everything connected with the trade, is done by a few men, as it is in all societies, and those men are loyal to the backbone. They do not mind your abuse; in fact, to use a Scriptural phrase, they forgive ye because ye know not what ye do. That, I think, answers a great many objections that have been raised, except on the patent medicine question. I have some notes about that which probably may be useful presently, but I will not refer to them now. I will defer them until a later period, because they do not arise directly out of the report. But I must just refer to what fell from Mr. Guyer and Mr. Giles, and Mr. Guyer has hit on a difficult matter of our arrangements. There is no doubt whatever that the question where to apprentice lads is getting a serious one. We find in the examination room that men are not apprenticed now in the ordinary sense of the term, and you know that in the Bill which we have in the House we propose to meet some of the difficulties, or at least to have an intermediate examination. We have always thought it would be desirable to have facilities spread throughout the country for getting technical knowledge independent of masters. We find that practical masters who are competent are not inclined; either they are too successful, or they are not inclined to take pupils, and you cannot compel them to do so. Perhaps outdoor apprenticeship will get more common in the south than it used to be, and then perhaps even J. Bell and Co. might be induced to take pupils under those circumstances. In the north it is very common to have out-door pupils, but in the south I think of late years it has been the reverse. Those who have a large business do not live at the business, and naturally they feel that it is hardly proper to take charge of an apprentice and leave him at the mercy of the assistants at night, on Sundays, and so on. That is one of the difficulties in the south, but my impression is that if you can have a course of general instruction for out-door pupils, and once you relieve the master from the necessity he now feels under of teaching chemistry, if he knows it, he will teach his pupil everything that goes on in the ordinary routine, and advise him as to his studies, and if you send him to a school not far off to get the elements of botany and chemistry, I think it would relieve principals very much, and moreover the question of premium would not be a serious one, and that is rather important, from the pupil's point of view. That is a thing that certainly will have to be carefully considered, and I think it will by-and-bye settle itself. I do feel, however, that thorough apprenticeship ought to be encouraged, and that what may be called errand-boy apprenticeship, that is informal apprenticeship, casual apprenticeship, the taking of an apprentice for the purpose of making him a mere errand boy, and keeping him in ignorance of what he has to do when he is twenty-one in order to be qualified, is a thing to be very much condemned. I am afraid it is getting very common, and I am not sure that some of us whom Mr. Guyer referred to are not in part responsible for that state of things, inasmuch as many of the larger houses have latterly given up taking pupils. With regard to the accounts, the answer to Mr. Giles is broadly this. Under the bye-laws—I forget the exact reference—but he will probably take my word for it, and I am not sure it is not in the Charter, the accounts must be signed by auditors who are members of the Society, and we find that the auditors who are members will not undertake to sign a statement drawn up in the usual accountant's form. They will only undertake to go through a statement of income and expenditure for the year and sign it. That has been our difficulty, and the other objection that has been raised against the change is the feeling that some of our friends who are in the habit of seeing the accounts in a certain way might think we were going to mystify matters. I do think, with all deference to Mr. Giles, that for the purpose of a body like ours, where we pay no dividend, the statement is quite as comprehensible as if put in the right way. I admit that technically Mr. Giles is perfectly right, but if we did what he suggests I am sure only two or three members would be able to understand the accounts, and I do think a large number of members do understand what we put before them now better than they would under the other system. But I shall be quite happy, if I am returned to the Council, to see what can be done. I certainly think it would require new bye-laws. It was considered some years ago—I was not then a member of the Council—and do not know the exact result, but I know that Mr. Hodgkinson, who has

just retired, and Mr. Watts, men carrying on a large business in the city, objected altogether to making themselves responsible for a true balance sheet with a capital account with all things valued, and so on, in certain ways which might or might not be correct, and to sign it. But if Mr. Giles will kindly leave it where it is I will undertake to see what was done before, and I have no doubt my successors on the Council will bear the matter in mind also. Of course Mr. Giles knows, as he belongs to a great many companies (and I think he is thinking of companies rather than pharmacies), that the question of how an account should be presented is always a source of difference of opinion, and probably the only way in big societies to get rid of that difficulty is by having a firm of chartered accountants, and then you tie your hands up at once and they are responsible. But the feeling of the Council in the past has always been that if you can get five men engaged in large business here for two days to go through the figures, you have a better guarantee of accuracy than you have with professional accountants. For these reasons, and mainly for the fact that the auditors must be members of the Society, the objection to any other accounts than the statistics that have been made in this way for many years has always been felt.

Mr. H. HALL: I should like to ask if it is absolutely necessary that the treasurer should always have such a large balance in his hands? It is I think £400 more this year than it was last.

The PRESIDENT: It depends a great deal on what is going to happen in January. Supposing the Chairman of the Committee in Scotland wanted money in January, as he does, say, at the commencement of the year to start with, probably £300 or something of that kind, it is necessary to keep a balance. We do not lose much by the balances. When there is any considerable balance we generally put it on deposit, and Mr. Hall knows that in the present state of the funds you get very little for short periods.

The resolution was then put, and carried unanimously.

PROPOSITION TO REQUIRE THE DISPLAY OF THE NAMES OF PROPRIETORS OF BUSINESSES.

Mr. PERCY WELLS was then called upon to move the following resolution, of which he had given notice:—

> "That in any application to Parliament for further powers or for any amendment of the Pharmacy Acts, it is the opinion of this general meeting that it is expedient that the name or names of every proprietor or proprietors of a business of a chemist and druggist shall be displayed in or on the place of business in a conspicuous and legible manner, so that the public may know who vend or compound drugs and medicines, and that a clause or clauses embodying the foregoing should be inserted in the Bill."

He said: A few years ago, the last time I had the pleasure of being here, I gave a hint somewhat in the form of the notice of motion I have put on the paper, hoping that some member of the Society with more influence, more time, and more ability than I could give to the subject, would take it up. I have waited several years and found apathy and indifference to the subject—perhaps not indifference, but an indisposition to take it up—and I have been prompted at this late period of my life to bring the subject before the Society, and ascertain the views of the members about it, assuming, of course, as I hope it is, that this is a fair representation of the trade and profession of the United Kingdom. Now, sir, I would beg to draw the attention of the members here present to the fact that in the year 1883, when you published a Bill which you either proposed to, or did, lay before the House, I really cannot say which—you talk a great deal and sometimes do not do much—but in the *Pharmaceutical Journal* for 10th February, 1883, there appears the following significant Clause 10:—

> "The Registrar of the Pharmaceutical Society of Great Britain may, at any time, and from time to time deliver, or cause to be delivered to the seller or the keeper of any open shop for the retailing, dispensing or compounding of medical prescriptions or poisons, or at any shop purporting to be the shop of a pharmaceutical chemist, or pharmaceutist or chemist and druggist, or chemist or druggist or whereat there shall be assumed, used, or exhibited any name, title, or sign implying that it is the shop of a person registered under the Pharmacy Act, 1852, or the Pharmacy Act, 1868, a notice signed by him requiring delivery to him within seven days thereof of a statement in writing of the name and address of such seller, or the keeper of such shop, and of his qualification so to sell or to keep such shop, and thereupon such seller or the keeper of such shop shall, within such seven days, cause to be delivered to the said Registrar a statement accordingly, and in default thereof, every such seller or keeper of such shop shall be liable to a penalty of £5 for each day so long as such default shall continue, and every person afterwards, during continuance of default, found selling poisons at, or compounding medical prescriptions at, or acting in the management of the business at such shop shall be liable to a penalty of £5 for each such offence, and the said penalties may be sued for, recovered and applied in the manner provided in section 11."

Now I maintain that if it was considered necessary to do that then, it is equally necessary to do so now. The mere fact of sending this return in to the Registrar would simply mean that it would be delivered to him; no one would take the slightest notice of it; the public of course would not care a rap for it because they would practically know nothing about it, and with regard to the trade and profession generally I venture to submit that out of the thousands that belong to the Society not one per cent. would ever take the slightest notice of it. *Ergo*, what benefit would it be? I fail to perceive one single benefit arising from it. Now I come to the motion which is standing in my name. I submit that the intention, though I do not care to go back much to intentions because they say a certain place is paved with them, but I maintain that the intention of the framers of the Pharmacy Act and its amendments was to great extent the protection of the trade. I am sure you will excuse me if I mention your name, because I must single out somebody, and I always like to fly at high game, and knowing perfectly well, notwithstanding your disclaimer, that you are as certain of being re-elected as I stand here addressing you, and I must confess that in you the Council has a very energetic president, and if the other members of it all followed your example perhaps it would be as well, and we should have a little more life and a little more divergence of opinion; I am obliged to single out somebody, and therefore I single out you as a type of what I protest against, and what I want to drawn the attention of the Society to. Please understand that I do not aim my remarks at anybody, I simply go on the question of principle. But now, sir, I take it that if A, B or C takes a prescription to your pharmacy, I will not humiliate it by calling it a shop, they take it to the pharmacy of Messrs. Dinneford and Co. I fail to find the name of Dinneford on the Register of the Pharmaceutical Society, but I find the name of Michael Carteighe. Now who occupies that place? If I as a stranger came to London, and had heard a great deal of Messrs. Dinneford and Co. (and

of course their reputation is world wide), and I take this prescription to your establishment, I should naturally understand that I took it to Messrs. Dinneford, but I should not, I should take it to the establishment conducted and under the personal management and control of Mr. Michael Carteighe. I maintain that that is wrong on your part; I maintain that it would be nothing but fair to the public if you use labels and everything about you with Dinneford and Co., and then in a bracket put Michael Carteighe. Now the same thing applies to everyone else who acts as you do. I want the public to know, and I believe that the law intended it to be so, that the public should know who compounds their prescriptions. I find that there are some honourable exceptions to the rule which is followed,—not that I say that your conduct is dishonourable,—I will say that there are some exceptions to your rule. I find in the case of a Manchester firm, which shall be nameless, there is the the old name kept, and in brackets the name of two members of the firm. I find it in the case of one of the members of your Council, Messrs. Richardson and Co., of Leicester, although they are not retail chemists or druggists. Still at the same time you will find that in all their advertisements, or all those I have seen, though I do not often read advertisements, the name of the members of the firms and their various qualifications are given. I consider that is loyalty to the public, that the public may know with whom they are dealing, and the trade may know with whom they are dealing; for a great deal, in fact everything, depends in our business, our trade or profession, upon confidence. The whole tenour of your remarks when applied to the subject to-day has been this, that the benefit of education will be the creation of confidence between the public and the chemist. Granted. I am sorry to say it has not produced much fruit up to the present time, but still at the same time there is a good sub-stratum of truth in what you say, and, therefore, I want everybody who conducts a business to create that confidence by having the moral courage to tell the public with whom they are dealing. You may say very likely that the name of Dinneford and Co.—I could mention several others if you like, J. Bell and Co. and others—but at all events you may say that is goodwill. Keep it, do not set it aside or get rid of it, but the object of my motion is that you should inform the public with whom they are dealing. Perhaps you may say this a quixotic notion of mine, perhaps it may be.

A MEMBER: It is.

Mr. WELLS: Perhaps it is; very likely the gentleman who says it is, is dealing in another name, and therefore I have touched a very tender point, but although I own I am frequently in the minority I frequently find that minorities in the end are right. We are ruled by minorities, because you generally find that minorities are spurred on until they compel the majority to succumb; that is the inevitable law and it has been the rule with all English agitations. Although I may be beaten on this occasion, I hope the ball I have set rolling will gather in force and strength, year by year, and although I may not be present in the flesh to see it, still I hope in the spirit I shall look down and positively see this carried out under the presidency of Mr. Michael Carteighe. There is one thing I decidedly object to in those who have the conduct of the Journal. I was determined that I would not give you, if possible, a loophole of escape as a Council, and I sent in this notice of mine, I speak under correction of the Secretary, months ago, so that it might be brought under your notice, and that you might not be taken unawares, and have it at the last moment, but should have due time to consider it. I had a letter from the Secretary, who said you objected to insert this clause in the Bill you had before Parliament, because you intended to make it a purely educational matter. I submit that this is a matter of education; that you should educate the public if you are educating yourselves to secure the confidence of the public. In the name of all that is fair and of common sense I put it to you, why are you ashamed of putting your names forward as men demanding and asking the confidence of the public? If you can answer that I should be very glad. Again, in the last Journal what do I find, that which ought to have appeared in January last. That a notice of motion had come in from me of a certain character, and asking the local secretaries, as it is a matter of considerable interest, and admits a wide difference of opinion, to obtain the views of the various members of the trade in their respective districts, so that they may be able to advise you. If the result of their application had been favourable to me, I have no doubt perhaps I should have heard nothing about it, but if they were opposed to me, I know the full force of your persuasive eloquence, and you would have brought the full artillery of your words to bear upon me and smother me if you possibly could. Now this is what I complain of. Here you have had about four months to think over this, and the result of your deliberations is on the 11th of May you wish to postpone the consideration of this matter for another twelve months, because it cannot come on for twelve months. Now that is not fair. I have given you four months to consider about it, and this is the lame and impotent conclusion you arrive at. You wish the matter postponed another twelve months in order that the local secretaries may see what the feeling of the trade is on the subject. I think I have said pretty well all I wanted to say, but I must apologize for the length of my remarks. I have made them as pleasant as I could. I have divested them as far as I possibly could of all personalities. I was obliged, as I said before, to single some one out, and I singled out the highest game I possibly could. I know that in you I have a formidable opponent, but I trust that notwithstanding all your accustomed eloquence, it will be utterly useless in opposition to what I hope will be the general feeling of those around me.

Mr. BARNARD: I beg to second the motion. I have no doubt there are many honourable firms that conduct business by properly qualified proprietors, but I do think if Mr. Wells's motion is carried into effect, it would certainly prevent, to a great extent, the infringement of the Pharmacy Act. It is a known fact in the East End of London, and in fact throughout the whole of London, that many infringements take place. I have two or three branch businesses, and of course I put my own name prominently on the facia, as I hold that I am qualified under the present law to do so, but there has been near me and my businesses a certain business which has changed hands eight or ten times; sometimes it is closed, sometimes there is a qualified proprietor and owner, and sometimes not. But how do the public know with whom they are dealing? There is a place in the north of London which has been carried on for eight years under the name of "The Pharmacy." There was originally a qualified proprietor, and he had a successor, and that has been carried on, and on the labels and the facia the words "The Pharmacy" have appeared ever since, though no qualified proprietor has had anything whatever to do with the business. Now if this motion of Mr. Wells became the law of the land, to say the least of it, the public would be able to trace who was responsible for the conduct of various businesses carried on under the names of certain companies, or in the names of medical hall, dispensaries, and so on; and it would positively do away, to an enormous extent, with the infringement of the Pharmacy Act. In fact, I do think this is one of the most important matters the Council has to deal with. It is very well for the Council to say that it wants the trade to take more interest in the Council, but if the

Council will take more interest in the trade the trade will take more interest in the Council and in the Society. These are ways in which a great deal of interest would be created, both in the public and amongst chemists outside the Society, and I have no hesitation in saying that if this became law we should have more interest in all matters appertaining to the trade. I must protest against these important matters being placed on the agenda as it were at the eleventh hour. It does not give us time to consider and think about these matters, and they come on after a long debate, such as we have had on the Report of the Council, just at 3 o'clock, and we have still another very important matter to deal with. Is it possible to deal with them properly in this way? I do hope that some longer period of notice will be given to members of the trade before they are called together at annual meetings to discuss these important questions.

Mr. URWICK: I certainly sympathize with the motion. I know many houses who carry on under other names, but they are all carried on by gentlemen who are fully qualified, and who would have the confidence of the public even, I believe, as much as under the names they use. But the evil is this, that you find in many shops in suburban districts a man qualified commences business. After a short time you find someone merely on speculation takes it, keeps up the name and label, and carries on the business; and not only so, but there is the opening of shops here and there by men not qualified. If one ignorant grocer, who knows nothing about chemistry or dispensing, opens a shop as a chemist, he comes within the meshes of the law; but multiply that ignorance seven times over, and he can set you at defiance. If the public knew that there were seven ignorant men unconnected with pharmacy conducting that business, I think they would not give them the confidence which they now obtain by secrecy.

Mr. ANDREWS: I rise to support the motion on the ground mentioned by the seconder, as it would stop the very large number of small shops carried on by unqualified persons. This subject came before the notice of the Council when I was upon it, and I warmly pressed the matter then, and I do so now. The reasons that induced me to do so then are even more conclusive now than they were at that time, for I have seen more of it since.

The PRESIDENT: I must remind gentlemen who approve of this motion that whatever we may think of these views, the powers to whom we have to submit them have something to say on the opposite side, and perhaps you will allow me to interpose at this stage. With regard to Mr. Wells's motion, I think Mr. Wells is a little hard upon us with regard to this notice. Speaking from memory, I think he sent us a communication which was placed before the Law and Parliamentary Committee with reference to the Bill, and we decided it was not expedient to put the proposal in the Bill. We gave him notice to that effect, and he gave a notice that at the annual meeting he would call attention to the matter. Surely he could not expect us to go on advertising from week to week his notice of motion until the annual meeting? I am afraid the name of Percy Wells, distinguished as it is, would be loathed by the time the meeting came on, and it would have lost all its first-time freshness. The Journal refers to the subject as part of the business of the meeting. The reference is purely editorial, for which the Council is not responsible. In all bodies like ours, when notice is given for the annual meeting, we do not consider it desirable to put it down until a reasonable time before the meeting.

Mr. GILES: With the notice for the meeting, I suppose; that is the usual course?

The PRESIDENT: Yes. The fact is I quite sympathize with Mr. Wells in all he said. I think it would be a great advantage to the public, and I do not think it would be in any way a disadvantage to ourselves to have this motion passed. But what I was going to say was that it would not prevent, as Mr. Percy Wells, and Mr. Andrews and Mr. Urwick seemed to think, the carrying on of big businesses unlawfully.

Mr. WELLS: I did not say so.

The PRESIDENT: Mr. Urwick did, and Mr. Andrews did.

Mr. URWICK; I beg pardon.

The PRESIDENT: Your object is that the public should know with whom they are dealing. What I say is that if this clause were put in any Bill it would be quite competent for one person, one member of a firm to carry on business for half a dozen persons all unqualified, and you could not touch him. That man could lend his name to a number of partnerships. In fact you would increase the very thing you want to stop. I am prepared to speak for half an hour on the subject, if the meeting would like, but I assure you the matter has received full consideration. Mr. Andrews knows that some years ago when he was a member of the Council it received consideration, and it received serious consideration when Mr. Wells's letter was sent to us. But we are of opinion first of all, that it would not meet the objections which have arisen without bringing in difficulties which are even greater than those which now exist. Secondly and finally, which is conclusive to my mind, I know the powers to be; the Government Department to whom we have to go will not have it at any price.

Mr. WELLS: Try it on.

The PRESIDENT: It is part of what I said before; you can make a proposition of that sort, put it on the table of the House, and there it would lie. But you cannot expect us as business men, having a certain amount of self-respect and some knowledge of public affairs, to go through the farce of preparing Bills and putting them before the Houses of Parliament to be laughed at.

Mr. WELLS: Why did you prepare one in 1883?

The PRESIDENT: Simply for the purpose of the rectification of the register.

Mr. WELLS: That is what I say.

The PRESIDENT: We did so then and submitted it. We gave attention to it and we pointed out the difficulty of keeping the register accurate and so on, but they would not entertain it at any price. The fact is that anything of that kind, that savours too much of *espionage*, is not liked by Government and Parliament. Our penalties are civil penalties not criminal ones. You must remember that if Dinneford and Co. do anything unlawful the solicitor can sue Dinneford and Co. The law has been altered with that object. If anybody at 180, New Bond Street, does anything unlawful it is not necessary to find Mr. Michael Carteighe. So far as the law goes in regard to the obtaining of penalties under the section of our act, Dinneford and Co., or Savory and Moore, or John Bell and Co., can be sued. That is held by all reasonable men as enough for the purpose of the Act, and much as we should like it, as I said before, the authorities are not disposed to encourage anything of the kind.

Mr. WELLS: It is not espionage. You cannot call it that.

The PRESIDENT: You know, as I said before, it comes to espionage or inquiry. Supposing Michael Carteighe opens half a dozen places in London, supposing he lends his name to a hundred people, as they do in France ——

Mr. WELLS: Then he would be a great scamp.

The PRESIDENT: I am afraid that is a true bill. But if Mr. Percy Wells says there is nothing personal in it, would you kindly have sufficient faith in me to accept this statement that in France it is done very largely.

Mr. WELLS: In England, too.

The PRESIDENT: In England it would be done still

more largely. Everything you propose to do in this particular way would lend itself to that particular form of abuse, and it would be encouraged to the utmost. Then about public companies ——

Mr. WELLS: I did not mention public companies. I would rather keep them out of the controversy.

The PRESIDENT: But I want to point out the danger. Government and Legislature say that the public suffer no harm if a public company trade as chemists and druggists, so long as they have a qualified manager. If you go for this, they would hold that all partnerships may be carried on just as companies are, and you would simply widen the door more and more; that is to say, in all partnerships which now exist where the individual partners are registered persons you would have it said at once, "Very well, what does it matter whether they are qualified or not. If one person who is a partner puts his name up and is manager, that is sufficient for the purpose." I submit that is not a thing to be encouraged, and that would inevitably follow from this. So that I do not think that Mr. Percy Wells will think we have been unkind to him with regard to this notice, and he will not think I am irritable under those good-natured statements of his, but will consent to withdraw his motion. I am quite prepared to say that it may be an unreasonable thing to ask local secretaries to consider a resolution of this sort, and come to a meeting of this sort to discuss it, but I submit as a matter of order that Mr. Wells has been treated in the usual constitutional way. His proposition has been considered, the Council has gone against him, and he comes to the meeting and asks you to concur with him as against the Council with regard to this. He requires that this shall be done, and that this particular form of resolution shall be inserted in the Bill now before Parliament. I say as representing the Council we decline to do either one or the other. That is a definite issue, and we ask you to vote, because it is for Mr. Wells if he persists to go to a vote.

Mr. WELLS: I have a right to reply.

The CHAIRMAN: Certainly.

Mr. WELLS: I sent in the notice in January; it was submitted to the Law and Parliamentary Committee, and on the 17th of February I received a notice stating that the Committee declined to introduce it. I did not send in this notice of motion until after the letter of the 7th of February, when you declined to introduce it. I did not complain of your conduct. I only stated this, that you had had four months to consider this thing which you had, and just at the last moment appears this notice in the Journal about the local secretaries. I did not make it so much a point of any particular charge against you, except the usual amount of delay and procrastination, which I believe distinguishes some of the acts of the Council of the Pharmaceutical Society. I must say I give you credit for your versatility of talent. Perhaps it is to be regretted that the forensic eloquence of the English bar has lost a great deal by your following pharmacy, for I think in the whole course of my experience, which has not been a brief one, I never met a case of better special pleading in my life. So you see, sir, I am willing to do honour where honour is due. I differ from you entirely. I am very sorry the Council does take up this view, raising this personal issue. I submit very respectfully that instead of doing injury to the trade it would be, as the gentleman who sits to my left has said, one of the greatest blessings that could happen to it, because it would compel every person who keeps a chemist's shop or pharmacy to put his name up, and if the name is not registered then we know that you can enforce penalties. If anyone is fool enough, as I say, to lend his name, the fact of his doing so can be easily exposed, and it will be the duty of the Pharmaceutical Society to expose conduct of that kind, which is unworthy, not only of any chemist, but of any man who has any personal respect. I must say, although perhaps I may be overshadowed by you, that if I live I am not going to give the little game up. If I am beaten, if I cannot get it one way, I will try to get it another, therefore in all good feeling I join issue with you and submit the matter to the decision of the members present, and I respectfully submit that if their decision is adverse to you, and in my favour, it will be your bounden duty to carry out the instructions of the representative body of chemists here present. It will not be for you to say that you will not do it, because, excuse me for saying so, you must remember that you are the representatives of the chemists, you are not their masters. Therefore, I hope that the body of chemists here present to-day will tell you that you do not occupy that position by leaving you and those who think with you in the minority.

The PRESIDENT: I must now put it to you. I do not know whether you observe, Mr. Wells, that in your wording you use the term "who vends and compounds drugs and medicines." Our powers are only with regard to the power of vending poisons, they have nothing to do with the vending of medicines. However, I will put it just as it stands.

Mr. NICHOLLS: May not that be amended to smooth matters over?

The PRESIDENT: I think we shall have to have more talk if it is amended.

The motion was then put and negatived by a very large majority.

THE MEDICINE STAMP ACT AND OFFICIAL PREPARATIONS.

Mr. NICHOLLS was next called upon to move the following resolution, of which he had given notice:—

> "That pharmaceutical chemists and chemists and druggists being licensed to keep open shop for the dispensing and retailing of medicines and drugs as regulated by the Pharmacy Act, the compulsory stamping of specialities prepared for sale only by the vendor and not for the wholesale trade is an unjustifiable impost and a curtailing of the liberties of the licensed pharmacist, and should engage the attention of the Council with a view to legislation thereon."

He said, Mr. President and gentlemen, I need not apologise to this meeting for bringing this matter specially forward, and, therefore, I ask a few minutes indulgence just while I give my reasons for asking the Council to support the movement I have set on foot. I think in the motion the whole gist of it is embodied in the few words that relate to the stamping of medicines. I refer to any kind of preparation that may be exposed for sale in the window or shop of a chemist and druggist. I apprehend when the Pharmacy Act was passed there was surely to be some *quid pro quo*, some balance on the side of the pharmacist, when he was compelled before he could trade to pass not an easy examination, but one which takes up a good deal of time. But I have inquired, and I find there is not only no balance, but there is an actual confiscation and plundering, the plundering of a part of the necessary income that is being cut closer and shorter as years go on. I am speaking of these facts, because when you take into consideration what is left after the trading by the stores, by the trading by general dealers, small drysalters, drapers, ironmongers, chandlers' shops, and perhaps what I ought to have mentioned first, medical men, for no one can convince me that a medical man holds up his profession, forsooth, when he holds himself out at 6*d.* a bottle. It is not a laughing matter. I put it to you seriously. A large part of the London trade is deteriorating year by year, and as time goes on the honour, the

integrity, the conscientiousness of a skilled pharmacist will fail to secure a living. Competition gets keener and keener, and there will be but one outlet for the poor and honest and honourable pharmacist, and that is applying to some sort of dealing by which he will be known. There is one outlet, and that is preparing his own specialities, and falling back, as it were, or resting on his oars on the official preparations of the Pharmacopœia. But from inquiries I have made I find that no official preparation of the Pharmacopœia can be sold by a pharmacist unless indeed he keeps his name from it, and leaves out all directions and the knowledge how to use it. I do consider that a very serious thing, because, as I said just now, the London trade is deteriorating year by year. Anybody now can go into either stores, a general shop, or even an ironmonger's, and in many places get prescribed for. When you take into consideration the meagre profit on the retail and the small dispensing, which is decreasing year by year, there is but one outlet—official preparations—while every true pharmacist can fall back upon and compound his own. But that is denied him, for those who apply to the Board of Inland Revenue will find that if you label a box of compound rhubarb pills or a small bottle of liquid extract of cascara, and merely detail its use and its dose, that will require whether it is 6*d.* or if it is under 1*s.* a 1½*d.* stamp. It is the fact, I tell you.

The PRESIDENT: Do you mind my interposing to put your case right? You have omitted to say what I think you intended, that you cannot recommend an official preparation for the cure or relief of disease.

Mr. NICHOLLS: That is what I meant.

The PRESIDENT: But you have not said it. Mr. Nicholls means that you cannot put up an official preparation, and say it is good for headache, without stamping it. That is the state of the law. You can only put the name of the preparation and the dose.

Mr. NICHOLLS: That is what I intended to say, but perhaps, as sometimes thoughts flow quicker than words, I have lost myself. I say, in all respect to the Board of Inland Revenue, that is wrong. If a man holds a licence from the Pharmaceutical Society, he should surely have that privilege accorded to him. I only submit that for your consideration to-day, because from what I have gathered it has not been fully represented by our Council. I have talked to all sorts and conditions of people, both in and out of London, and I feel firmly convinced that if we were to take half the trouble the match-makers did with the Right Hon. Robert Lowe, we should very soon get that little point conceded by the Chancellor of the Exchequer or the Board of Inland Revenue. There is just this little point, which is also worth considering, on the same matter, whether if from the experience of the Council's application that nothing more can be done, we can get at any rate some certain and decided guide as to how far we can go in official preparations, and whether or not we have the power of putting them up in the way I have mentioned.

Mr. FITCH: I rise to second the motion, for I know what an evil it is to the trade to have these prosecutions, or, as I call them, persecutions, though I have not had any. I find that every little shop, draper's, or any other place, can sell these articles, which are really liable in law, but the attention of the Government Department is strictly confined to gentlemen who come and pass examinations in these halls. If we do not get some redress, I quite agree with Mr. Nicholls that the end of the trade is not far off. You have told us, Mr. President, that one result is, if the rising generation will be so examined, that the public would look up to them; but you know that is not true, for I see your name on this board twice as a prize man, and yet you hesitated to put up your own name. It is a contradiction. You say that if you will only pass our examination that you may put your name up, and you will see what confidence the public have in you. I do assure you that I have been accustomed to come to this place from time to time and for a long time. I did not know that Mr. Hyde Hills belonged to the firm of J. Bell and Co. I thought they were two distinct people. How can the public distinguish in that way? To come back to the patent medicines, I ask how is it fair (and I think the attention of the Board of Inland Revenue should be brought to this) that it should not charge the same for a licence for one shop as it does to Messrs. Walton, Hassall, and Port for fifty. The licence is not so irksome now as it was when it was a three-guinea licence, but it is not fair to the trade to say that they should have a two guinea licence for each chemist, and a large company only pay one two guineas for all their shops. It is not on the lines of equity. I myself have suffered from this competition. I have a grocer next door to me who took to selling patent medicines at the very lowest cost price, and not only did that, but put boards out announcing it. My neighbour said to me, "Will not you go into tea," I said, "No; I will not touch his trade, but I shall fix him." I took care to have in my lease, and he had also in his, that he was not to pursue any art, trade or adventure carried on in a shop or dwelling of which the demised premises formed part, and I threatened my landlord with an action if he did not carry it out. I had an answer from my landlord's solicitors to say that they had written to the offending grocer, and that in their opinion he was infringing the terms of his lease, and that he hoped that warning would cause him to desist, and he did. I throw this out to show you that if when gentlemen take shops when there are three or four belonging to one landlord, if they only use common sense they may protect themselves. Leaving that point, this patent medicine question is a very serious question. We have not the liberty in our trade that other people have. We are not like drapers, who can ticket anti-rheumatic flannel as preventing rheumatism, and no exception is taken to it, and, therefore, I agree that we ought to have the right, as long as we do not publicly advertise, to exhibit any preparation in virtue of the qualification we have given to the public, which you say the public appreciates.

Mr. JACKSON: I saw this motion announced in the Journal to be brought forward, and I think it is one of the most sensible I have seen there lately. Supposing as a chemist I gave a man a bottle of medicine and charged him 1*s.* 6*d.* for it. I am not touched, but supposing I put it on my counter with a label on it to save time and trouble. I have to pay 1½*d.* on it [3*d.*!]. A customer may come in and pick it up, and he will say, I do not like patent medicines, have you not got anything else? It creates an objection at once, I have had it happen lots of times. Then you have to explain it is not really a patent medicine, but you are obliged to put the stamp on. It seems as if everything is done to crush out the chemist. It is very much against the sale of articles to be compelled to put stamps on. Again, if you want patent medicine stamps, the Inland Revenue will not allow the usual percentage to wholesale dealers. Anybody buying less than £1 worth has to pay 5 per cent. beyond the actual 1½d. for each stamp.

Mr. ALLEN: They can be got from any post office.

Mr. JACKSON: I sent to the district office and had a difficulty in getting them. The only chance of getting them is through the wholesale houses, and the patent medicine houses. I hope the Council will think well of the matter, and that we may be able to sell our own things without stamping them, as proposed by Mr. Nicholls.

The PRESIDENT: Gentlemen, this subject of course is a very big one, and there are not very many of us,

either present or absent, who have the whole threads of this complicated question at their finger ends, but I may say it has occupied my attention for many years. I was weak enough, in a fit of juvenile enthusiasm, in the first year I was on the Council to positively move, and I think I carried, a resolution, much to the the disgust of my wiser and better-informed seniors, to abolish the patent medicine system. I think that will be found on the minutes somewhere about 1866. My co-sinner was Mr. Henry B. Brady, and in the course of about forty-eight hours we found we had made a very grave mistake. I do not know whether he has ever admitted it, but I do now most fully, and from that time to this I have watched these various clauses. Of course it is my duty to do so, and I am bound to tell you that a very large part of my time is taken up with individual cases when they are pounced upon in this way. I cannot invite you to make me your private secretary in matters of this sort, because it is a tremendous tax on my time, but I have done it, and consequently I have some knowledge of what is going on, and what the views of the authorities are. You must not be too severe on the Board of Inland Revenue in this matter. This is *apropos* of those who are getting into what is called hot water. It is a very much better policy to conciliate the Board than to tell it, as so many of you are doing, that it is breaking the law. Directly you do that the Board insists on your paying the penalty, and leaves you to go to fight it at law. If the Board tells you that it interprets the law one way, and that its object in interpreting it in that way, and in carrying it out, is to raise funds for the Queen's service, what have we to say? This is your proposition. Here is the Act which was passed with the object to raise money, and it is raising more money every year. Quackery is increasing in that sense naturally, because in the process of what may be called the evolution of the trade of recent years, a peculiar kind of evolution arising from the great companies and stores, dealing in everything, it comes to pass that retailers, not only pharmacists, but others, put up their own proprietary medicines. Very naturally that is what they wanted to do. It is equally natural that the Board of Inland Revenue authorities should say they want the taxes on these patent medicines; it is the primary cause of what has been going on during the last few years. I am sure you will all bear me out that nearly all of us have been in the habit, with the view of preventing this competition, to a certain extent of putting np more of our own preparations. Well, gentlemen, you must put the stamp upon them and get it out of the public; that is what they tell us. The Board simply says "stamp it," and say anything you please; but we cannot treat you any differently from anybody else. The whole question can be dealt with only in one way. It must be either left as it is, and there cannot be, as it seems to me, any reasonable appeal to the Board of Inland Revenue to do as Mr. Nicholls suggests; if registered chemists and druggists are allowed to put up and recommend for disorders official preparations, other people, not registered chemists and druggists, will take the same official preparations, and they will stamp them, and the actual trade benefit I assure you will be practically nil. You will simply teach those who supply groceries and other hucksters with packed medicines an additional lot of things to put before the public. I put it to you, take a simple thing like sal volatile, camphorated or otherwise, do you suppose you will have it all your own way in your particular district if you put it up without a stamp? Would not the neighbouring grocers, or Messrs. Walton, Hassall, and Port, or any man of that kind, put it up in a smaller bottle, perhaps with a 1½d. stamp, and charge the public accordingly, and say whatever they pleased about it? I think from the point of view of trade you will get nothing from the proposition. In fact I do not see that you can ask for any special exemption. Pharmacists are not special dealers in patent or proprietary medicines. Registered persons, even persons that were so called chemists and druggists of 150 years ago, did not sell patent medicines at all; the original sellers were booksellers. It is no use to complain of the bookseller opposing us with patent medicines. He is the original man, and we have stolen the bookseller's clothes. We really must be reasonable. I am perfectly willing to be aggressive, but you must not come here and tell me, comparatively young as I am, that you are to have the sole right to deal in patent medicines, or that you can claim to deprive a medical man of any rights that are given to him by law for the sale and dispensing of proprietary medicines. These are propositions that cannot be held for a moment. We have become mixed traders ourselves, and in the case of patent medicines we are on all fours with grocers, ironmongers, and booksellers, and Government will not deal with us individually. Now comes the question, is it desirable that such an Act as this should be amended or abolished? It is not true that the only persons who have to pay fines are chemists and druggists. I have with my own eyes seen heaps of others, and lots of my brethren also, whose names are in the pigeon holes at Somerset House; but I will tell you why there are not proportionately so many of the grocers. Many of our competitors in trade have these things put up for them; they sell packed goods put up by a certain firm not far from you in the north of London, and it protects these persons, who are supposed not to know anything about it, and always takes care that the labels are correct; or if it is a stamped article takes care to have it stamped. It is not at all uncommon for the various people throughout the country to write and ask whether certain things are stampable or not before they sell them, so that as a matter of fact a very large part of the revenue at the present moment, and for some years past, comes from other persons as sellers than mere chemists and druggists. Now I come back to the question, can you do anything with the Act, can you repeal it? If you were to repeal the Act I think you would commit as great a tactical blunder as you did years ago, when you said you would like to have the licence reduced to a dead level and made cheap. How many would prefer to pay a five guinea licence now, instead of two guineas? The very moment the licence was reduced every little shopkeeper in every little town began to deal in all these proprietary medicines, and it was the commencement of the store system in all its enormity. Before you talk about the repeal of the Act, do take my advice and hesitate. I believe that to abolish this would be the worst thing that could happen to us, You would have little caravans and tricycles, with beautiful vans behind them, with penny packets of every conceivable medicine with every recommendation being sold in front of your shop doors. Had you not better pay your stamp and say what you like, and do anything you please, than run the risk of such a fearful competition as that? Why do you not as far as possible send your labels to Somerset House? Why cannot you destroy even, if need be, a pound's worth of old labels, and begin *de novo*, and say we will stamp everything and go in for quackery, if you wish to do so, in its entirety? These are the things they put before you, and that is what you have to do, if you think it pays. The registered person of the future, in my opinion, ought not to try and sell as many unstamped articles as possible, that is if he wants to deal in proprietary articles at all, but let him stamp them. If a man wishes to go in for it at all, to have any domestic remedy, I advise him to stamp his articles at once. If he does not intend to do anything more than name the

article with his own name and address he need not do so. But the greater number are not in the position of some houses that do not sell any patent medicines at all of that kind, and I think it is wiser to be on the safe side and stamp them. Sell a little less for the money, if you like. All you gentlemen assume, what I venture to think is not correct, that this tax is a tax upon us; the Board of Inland Revenue laughs at me and at you when you write like that. The Board says it is a tax on the public; you charge what you like for your medicines, the public have to pay it, and the only tax you pay us is the 5*s*. a year. The stamp is got from the public, and we want to get more out of it. If you want to move in this direction, I will tell you what will be the inevitable result, I fear; that you will not succeed in getting the Act repealed. It is a matter of convenience. Many people object distinctly to quackery, and think it is a good and useful tax. But you may get some amendment, and this will be the sort of amendment, which would be worse or as bad as the abolition for us. I know that this is in contemplation; I know it is in the pigeon-hole, only waiting for an opportunity. I do not think it will come unless we move, but I know it has been contemplated for a long time. Some of our brethren have repeatedly said it is a great hardship to have to pay a 1½*d*. label on a 6*d*. bottle of stuff. They think of adopting the same plan as they have done with the licence, and that they are going to reduce the stamp. But how would you like to have a ½*d*. stamp for a 2*d*. bottle of medicine, 1*d*. for 4*d*. and 6*d*., and 1½*d*. for 1*s*.? That, I believe, would be very equitable, and then you will have hucksters coming in the same way with a halfpenny stamp stuck on a 2½*d*. bottle all over the streets, in every market place, and doing a great deal more damage. That being so, my own conviction, and the conviction of many of my colleagues who have gone into the matter with me, for on the Committee of the Society these cases often come before us informally, and having considered it, our conviction is unanimous that on the whole the evils we have had better be borne. Of course, some of you who are unkind and ungenerous say, "Oh, it is all very well for you to say that; you do not want any more work to do." It is not anything of the kind. It is not a case of *non possumus*, but of careful balancing done by men who know something about business, and who often through one of them that happens to be President do not think it undignified to go to Somerset House and talk to the officials about their brethren's troubles. We are told we do nothing for the trade. I have been doing something for the trade every day since this day twelve months, and my colleagues the same. It is a long stretch from this question of the Patent Medicine Stamp Duty to the research laboratory, but happily we have men on the Council who can compass all these things and have your sympathy, in spite of what other people would lead you to suppose. I suggest to Mr. Nicholls that he should be content with this discussion. I can assure him that he would not realise what he wishes, even if the legislation he desires could be got, and that the best course open to us now is to be quite sure that when we want to sell any proprietary medicine, or any medicine with a recommendation, whether an official preparation or not, it comes within the duty, and we must put a stamp upon it. If there is the slightest doubt, and if you do not want to stamp it, send to Somerset House, and get all your labels properly looked through. They meet us with this forcible objection if we raise the question of interpretation. They say, "We are ready to advise any subject that comes to us, not only a chemist, but anybody who has a licence. He can put his sheet and labels before us, and we are willing to aid him, and say these are or are not liable to duty." What more can a Department of the State do in the matter? We could do that for you, but the great difficulty would be that on doubtful points our views might be overruled by the Department. It has often occurred to me here whether we could not undertake to advise members in these cases, but there is just this difficulty about it, that all the penalties come on the border line, and it seems to us it would be dangerous to advise you in certain cases, where probably the Department would be inclined to take the opposite view. It is much safer for those who have any doubt to send their labels to Somerset House, and see if they involve a stamp, and if so stamp them, and say what they please. Lastly, let me correct an error of our old friend, Mr. Bland, whom we are very glad to see here. In the absence of our Emeritus Professor Redwood, we have not too many men of the Bland type, and I want to put him right, because he is a man of sense, as well as a good man of business, and I want to point out to him that the reason why Lamplough fought his case was that he claimed that his stuff was exempted under a special Act of Parliament. Do not run away with the notion that you can fight the Inland Revenue on the existing law on a number of things. You cannot do anything of the sort. That Act gives such enormous powers to the Board, that it does pretty well what it likes. But those powers do not extend to salts which evolve carbonic acid gas when mixed with water, to mineral waters, and to things like Lamplough's saline. Somewhere about 1813, when one of the Acts were passed—a sort of Consolidation Act—it was found you could not even sell a seidlitz powder without a stamp upon it, and so in the following year or two an Exemption Act was passed. You will find this mentioned in the Calendar, and in the Exemption Act they wanted to exempt seidlitz powders and mineral waters, and in order to do that they used words which practically exempted Dinneford's magnesia, Lamplough's saline, granulated citrate of magnesia, and so on. There is a feeling out of doors that some of these people who sell these things have special favours from Somerset House, and have special ways of doing it, but really they are mistaken. Whether they will be exempted in any amendment of the law or not I do not know, but while the Board accepts that view it raises the question that the moment you mix with these preparations something medicinal, something that is not of the essence of the effervescence, so to speak, then that stuff ought to be considered a patent medicine within the original Act, and it claimed Lamplough's stuff was a medicine, that it contained perchlorate of potash, or something of that kind, that it was not one of those powders that were exempted. They fought on that point—it was a friendly campaign, and nobody regretted the result more than Mr. Lamplough himself, for it hurt his business very much indeed, as a matter of fact. But the Courts held that Lamplough was exempt. The Board now claims, and is prepared to fight that view, that if any of you mix a potent thing like strychnine and like some things made by Bishop now, which contain a potent drug mixed with granular effervescing stuff, it gets rid of the exemption. But what I want you clearly to understand is, that where well-known medicines are advertised for various diseases and are not stamped, it is because they belong to the class of natural mineral waters or powders which when dissolved in water effervesce, that they come within the exempting Act, and the proprietors can snap their fingers for the present at the Board of Inland Revenue. That is the clear distinction there is between that class of things and the others, and it was under that special Act that Lamplough fought his case.

Mr. BLAND: I am much obliged to you for your benevolent intentions. You told me that you were going to correct an error into which I had fallen, but I do not at present see that you have shown that I have taken a mistaken view of the law and corrected any mistake into which I had fallen. I pointed out dis-

tinctly that there are certain qualifications and characters which make a medicinal preparation liable to the duty under the statute. My complaint is against the Commissioners, that they insist on not reading a number of these characteristics together, which I cannot but think was the original intention, and maintain that the possession of any one of these characteristics renders the medicines liable to the stamp. It was for that very reason that Mr. Lamplough's preparation was pitched upon by the Commissioners, because it contained a medicinal substance. But all mineral waters that are of any value at all contain medicinal substances. I say we have good reason to find fault not simply with the stringency of the law, but with the uncertainty of the practice, and not only with what they prohibit, but with what they allow. I think it is very desirable that we as a body should cease to assist in circulating a great deal of printed matter which comes from the proprietors of some of these articles, for two reasons; one is if we circulate the papers which confessedly contain a great many lies we cannot be held free from a certain degree of moral responsibility in the matter, and secondly, we are developing the trade for grocers, hucksters, and marine store dealers, who supply the public with these articles at nearly the same price.

The PRESIDENT: I am sorry to have misunderstood Mr. Bland. I thought I understood him to say why not fight like Mr. Lamplough did, and my only object was to let you know that Mr. Lamplough had a right to say what he pleased about his preparation, to use the possessive case, and recommend it in every case under the special Act. Many of us are caught for the possessive case, sometimes for using "stomachic," or something of that kind, and sometimes for "being prepared only by." He did not fight any of these points at all. He said I claim entire exemption, and, therefore, his case was entirely different from the ordinary run of cases that come before us; that is what I want you to understand. But your cases, such as I have seen of them, would not have been so successfully carried through a court of law. Probably Mr. Nicholls will be satisfied, after this discussion, to withdraw the motion.

Mr. NICHOLLS: I shall be satisfied, if you will allow me to make this explanation—one which induced me entirely to bring forward this matter, and one which I thought you were going to explain, but which I think you, quite unintentionally, misled us upon; for instance, with regard to official preparations. It is all very well for you to say that all hucksters or stores, or ironmongers could vend official preparations like pharmacists. You must not compare the two. On the one hand, the pharmacist is a trained man, an examined man, and he is well able to act as the seller of those things, whereas in all other cases a mere man without having such a preparation, people would not understand at all. You may label it what you like, but it is an official preparation, a scientific compound which the pharmacist is engaged in preparing, and which he is master of. I think you have overlooked the importance of the argument.

The PRESIDENT: Mr. Nicholls is good enough to withdraw the motion. I am sure you will be all obliged to him for giving us the opportunity of talking about it.

ELECTION OF AUDITORS.

The PRESIDENT: The next business is the election of auditors. The number of auditors put down for election being precisely the number required by the charter and bye-laws, I will ask you if it is your pleasure to elect them. The names of the gentlemen are as follows:—

LESCHER, FRANK HARWOOD, 60, Bartholomew Close, London, E.C.

STACEY, SAMUEL LLOYD, 300, High Holborn, London, W.C.

UMNEY, CHARLES, 50, Southwark Street, London, S.E.

WATTS, WILLIAM MANNING, 32, Lower Whitecross Street, London, E.C.

YATES, FRANCIS, 64, Park Street, S.E.

The election of these gentlemen was agreed to unanimously.

The PRESIDENT then read a list of names of gentlemen who had been nominated to act as scrutineers, and their appointment was unanimously agreed to.

The PRESIDENT then called attention to the following registers, which were placed on the table in accordance with the bye-laws:—

Register of Members, Associates, and Apprentices of the Society.

Register of Pharmaceutical Chemists.

Register of Assistants.

Register of Apprentices and Students.
Under the Act of 1852.

Register of Chemists and Druggists.
Under the Act of 1861.

The PRESIDENT then declared the meeting adjourned until 3 o'clock the following day to receive the Scrutineers' report.

THANKS TO THE PRESIDENT AND COUNCIL.

Mr. URWICK: Before we separate I think we must tender our thanks to the President and Council for their services during the past year, and especially to the President for his able conduct in the chair to-day. I must congratulate the Society and himself that he does from year to year grow more eloquent and more skilful in dealing with the business. We must also thank him for the patience with which he has heard our remarks, and the able manner in which he has replied to them.

Mr. FITCH: I should like to second the motion. I am personally very grateful to the President for the explanation he has given us about the Patent Medicine Act.

The motion was put by Mr. Urwick and carried unanimously.

The PRESIDENT: On the part of my colleagues and myself I beg to thank you most heartily for your kind vote. I have to talk straight, gentlemen, sometimes, but I am not always the brute that some of you seem to think me. I beg to thank you on my own behalf, and say that those who do your work, do it as most druggists do their business—almost too well. I think the thanks of the Society are also due to the unwearied industry, zeal, and activity of our Secretary and Registrar. He is a gentleman who cannot have the same position as your Chairman has. He is often abused and cannot run away, but has to submit to that castigation that every member of our Society chooses to write to him, and if he gets under this a little bit stolid at times, the only wonder would be if it were otherwise. How is it possible for a man to avoid getting more and more official in a great Society like ours, where you have so many complaints, many of which are founded on want of knowledge and details of special information which is afterwards given them? I therefore think it is only due that I should express to him your thanks on this occasion.

ADJOURNED GENERAL MEETING.

Thursday, May 16.

MR. MICHAEL CARTEIGHE, PRESIDENT, IN THE CHAIR.

The adjourned meeting for receiving the report of the Scrutineers was held on Thursday, May 16, at 3 o'clock.

The Chairman of the Scrutineers, Mr. T. Howard Hall, read the following report:—

Scrutineers' Report.

We, the undersigned Scrutineers, appointed at the Forty-eighth Annual General Meeting of the Pharmaceutical Society of Great Britain, do hereby certify that we have examined the voting papers committed to us, and report the following:—

Voting papers reported by the Secretary to have been issued	3371	
Voting papers received	1672	
Voting papers issued but not returned	1699	
Voting papers received		1672
Voting papers disallowed:—		
Informal	17	
Received by post too late	88	
		— 105
Voting papers registered		1567

Result of the Poll.

Martindale	1253	Allen	1156
Southall	1252	Watt	1131
Greenish	1228	Newsholme	1051
Bottle	1226	Leigh	1008
Martin	1222	Carteighe	975
Cross	1221		
Abraham	1195	Nichol	916
Schacht	1170	Butt	898
Hills	1167	Broad	893

T. Howard Hall, *Chairman.*

John W. Bowen.	T. E. Scoley.
J. C. Hyslop.	John Holding.
T. O. Sandell.	Henry Mathews.
Edward B. Stamp.	W. E. Haden.
Ralph Hall.	R. O. Fitch.
Jas. H. Gradidge.	Henry Bate.
Chas. Troke.	Wm. Howell.
A. J. Brown.	Pelham C. Maitland.
W. Harvey.	Chas. M. Luxmoore.
J. W. T. Morrison.	

After reading the report, Mr. Hall referred to the large number of voting papers that had been disallowed because received by post too late, and said there had been some expression of opinion among his fellow scrutineers that since it was allowed to deliver a vote in person at the annual meeting, the time for receiving it by post might be made later. He presumed, however, that the Secretary had no option, but was bound by the regulation printed on each voting paper that if sent by post it must reach him one clear day before the day of election.

The President said that was so, the manner of voting for members of Council being regulated by Act of Parliament.

The New Council.

The Chairman then declared that the following gentlemen would constitute the Council for the ensuing year:—

Abraham, Alfred Clay, 87, Bold Street, Liverpool.
Allen, Charles Bowen, 20, High Road, Kilburn, London, N.W.
Atkins, Samuel Ralph, Market Place, Salisbury.
Bottle, Alexander, 37, Townwall Street, Dover.
Carteighe, Michael, 180, New Bond Street, W.
Cross, William Gowen, Mardol, Shrewsbury.
Evans, Gwilym, 7, Stepney Street, Llanelly.
Gostling, Thomas Preston, Market Hill, Diss.
Greenish, Thomas, 20, New Street, Dorset Square, London, N.W.
Hampson, Robert, 31, Baalbec Road, Highbury Place, London, N.
Harrison, John, 33, Bridge Street, Sunderland.
Hills, Walter, 225, Oxford Street, W.
Leigh, Marshall, 46, Dyke Road, Brighton.
Martin, Nicholas Henry, 29, Mosley Street, Newcastle-on-Tyne.
Martindale, William, 10, New Cavendish Street, London, W.
Newsholme, George Thomas Wilkinson, 74, Market Place, Sheffield.
Richardson, John George Frederick, Elmfield, Knighton, Leicester.
Robbins, John, 147, Oxford Street, W.
Schacht, George Frederick, 52, Royal York Crescent, Clifton, Bristol.
Southall, Alfred, 17, Bull Street, Birmingham.
Watt, James, High Street, Haddington, N.B.

On the motion of the President a vote of thanks was awarded to the Scrutineers for their services and the proceedings then terminated.

Correspondence.

"What is the Use of the Pharmaceutical Society?"

Sir,—Whilst this question seems to greatly exercise the minds of some of your correspondents it is well, I think, that both sides should receive due ventilation.

Mr. G. G. Hornsby, in your issue of May 11, represents what he is doubtless pleased to consider one side of the matter. May I therefore mention what I deem to be the more faithful delineation?

Mr. Hornsby doubtless likes to obtain full value for his money (in this I am sure I am fully with him), and the subject of the forty or so guineas from which he has parted is evidently a sore point with this gentleman; but probably he will readily call to mind an old maxim that "you cannot eat your cake and have it." Mr. Hornsby will possibly reply that he has never possessed that return for his money, but I would suggest that to be the fault of the gentleman himself, and not the fault altogether of the Society. The Journal is by no means the only "corresponding advantage" that anyone residing even at Brighton may obtain, should they wish it, and to those nearer London the advantages are necessarily greater. Should Mr. Hornsby plead ignorance of this fact I would recommend that he make himself more fully cognisant of matters as they stand before he again pose as a reformer of the first water. The Research Laboratory will doubtless survive this gentleman's sneers, especially when the authorities remember that such a man as Stephenson was subjected to the jeers of an ignorant populace when he was pursuing investigations which have since proved of untold benefit to the whole human race.

Without question there is much that is obnoxious in the Medicine Stamp Act, and that, in common with some other subjects, demands early attention, but it certainly strikes me as a very queer way of bringing about a reform to withhold support from the Society through which that reform must come.

Mr. Hornsby speaks more dogmatically than correctly of the Curriculum Bill as an "obnoxious Coercion Act," for if we are to apply that term to educational matters then of course both the Preliminary and Minor are but "obnoxious coercion," carried out relentlessly and systematically; and the same term would have to be applied to the Education Act, which gives the child of the working man a better start in life than his parents ever had, by providing him with that very necessary weapon of warfare, education, albeit the weapon provided be somewhat rough. Your correspondent complains that the Society does not "go in for power which shall bring in some reward for labour and outlay," and in the same breath condemns the very proposal that would if carried into effect produce a happier state of things, by giving to the better educated chemist greater resource, and consequently greater advantage in his professional career.

I claim no authority to speak on behalf of others, and do not borrow weight for my words by saying what "many of us," or what "we" think, but simply wish to express my own opinions in the matter, thinking that it is possible there may be others like-minded with myself.

52, *Harrow Road, W.* Albert H. Wilkerson.

Sir,—Much has been said and written concerning the use of the Pharmaceutical Society, but most of the opponents are those who are in no way connected with it. What sort of profession or trade we should be without our representatives and fine building in Bloomsbury I can hardly imagine. Let the outsiders come over and help us and elect whomsoever they think the most suitable men to the Council; by that manner they would be able to give practical vent to their feelings. What is the use of a few men of one opinion and a few of another? Neither can serve themselves in any direction, except from discord in the ranks, and making the Pharmaceutical Society a weak instead of a strong body. It ought not to be said that the Society is only a representative of a minority. How can a minority expect powers to do all that our opponents require of us? Many also are fretting about the "Medicine Stamp Act" and the "Sale of Patent Medicines." Why should we trouble about for the most part such worthless articles? I do contend that chemists should have the sole right to retail drugs and preparations mentioned in the B.P. No one is better suited for the work than the pharmaceutical chemist. His examinations are essentially based upon his knowledge of that work. But before we make it illegal for grocers and oilmen to sell such preparations it should also become illegal for chemists to sell teas, groceries, paints, etc. It would be a one-sided law to restrict them while we remain free. Besides, it is a disgrace for scientific men to be selling such articles, it requires no skill. Why not turn to photography, electricity, etc.

I heartily agree with "A. P. S." in his remarks for a diploma for Associates, something one could admire. It would bring hundreds to the Society. I trust the new Council will seriously consider the matter, and do their best to make the Curriculum Bill become law. A higher standard of education will give a higher status to the pharmacist, and make him more worthy of consideration from Parliament and protection from illegal traders. I wish the Society every success.

J. Wellesley Douglas.

Irish Pharmaceutical Legislation.

Sir,—As the majority of the Council of the Pharmaceutical Society of Ireland seem determined to humbly eat the unwashed leek held out for their deglutition by the combination of druggists, drysalters and general merchants in Belfast, it becomes the duty of the licentiates of the Society here to take steps to protect the interests of the public, themselves, and their assistants and apprentices. Your columns have recorded from time to time the erratic, inconsequent, and indeed inconsistent proceedings of that "team" as they were styled by the President of the Pharmaceutical Society of Great Britain, but have not as yet been the medium of much correspondence with reference to the question, and it may therefore be necessary to recapitulate some of the points which are at issue, and the position of parties in the matter.

Previous to 1875 only "licentiate apothecaries" could dispense prescriptions. Any one could retail any kind and quantity of poison, but even doctors of medicine and qualified surgeons could not dispense the prescriptions of other medical practitioners, only their own. The apothecaries were constantly preferring the higher departments of their profession, and as they had all their classes for medical degree, many of them gave up entirely the selling and dispensing of medicine. In 1875 the Irish Pharmacy Act was passed, under which pharmaceutical chemists were licensed to dispense medicines and perform the other trade functions of the apothecary. By the same Act the right of sellers of poisons to continue their sale was reserved to them.

From that date, therefore, there were only three classes of persons authorized to sell poisons in Ireland: the apothecaries, the pharmaceutical chemist, and the old poison sellers, some of which last called themselves druggists, but almost none called themselves chemist or chemist and druggist. The pharmaceutical chemists were gradually increasing in numbers, and were, as opportunity offered, filling up the openings which were from time to time apparent, but this was a slow process, as the principal part of the trade, apart from dispensing, was in the hands of the druggists and grocers. As few of these made the preparations they sold, and as the business of supplying them was chiefly in the hands of the local wholesale druggist and drysalter, and as that department of business afforded larger profits than the supply of cream of tartar, castor oil, salts, senna and brimstone, an increase of the number of retailers was the evident interest of the wholesale people, and all our sundry shopkeepers in country places were induced to "get a small stock of the drugs in common use in the district for the convenience of their customers." As none of these had any right or title to dispense medicines or to sell poisons, it was the duty of the Irish Pharmaceutical Society to prosecute them, but they put the law in motion only in a few cases where particular circumstances obtained, giving as a reason the costs of the prosecution. The presence in the Council of influential, interested wholesale dealers had no effect in producing this culpable apathy, but was only an accidental coincidence. With this tacit encouragement the numbers both in town and country greatly increased. An effort was made in Belfast by the Society to indicate the law, but such were the obstacles, that great delays and several failures in the prosecutions took place, and when these initial difficulties had been ascertained and preparations for surmounting them had been formulated, the Council struck hands with the illegal traders and proposed, "for a consideration," not only to give them a quittance for past offences, but to set them up with a legal title to go on *ad libitum*. The members of the Pharmaceutical Society number about seventy, and there are in all over three hundred licentiates, but of course only the members elect the Council. On a census of opinion being taken as to the Council's proposal to admit the illegal traders to the privileges of the qualified men, a considerable majority of the whole declared against the proposal, and not more than three persons in favour of it. In spite of this, however, the Council persists in trying to register them as "registered druggists," and the only reason which outsiders can see is that there will be a large amount in fees obtainable which will be available for establishing a school of pharmacy in Dublin. The devious vagaries of policy which have disfigured the acting of the Council can only be paralleled by the complaisance with which the various changes have been made. They could "give points" to the old man with the ass, usually taken as a type of an obliging disposition, and an absence of judgment and consistency. A few short weeks ago they contemptuously refused to hear a deputation of the *crême de la crême* of the Belfast druggists, etc., and now they are approaching them humbly, hoping to be permitted to leave some finger-marks in the Bill, which, it is understood, the latter are going to promote in Parliament.

They were well warned timeously against any negotiations with the Belfast Association, as they were sure to get worsted in any arrangement they might try to make with these astute negotiators. It must, however, be conceded that on one point they have been consistent; they have always endeavoured to get in as many registration fees as possible. It is not fair, however, that the druggist in business before 1875 should be fined in a registration fee, as they are not benefited in the slightest under the proposed measure. The new illegitimate traders are doubtless pleased to pay any reasonable amount as a substitute for an examination, but the others, most of them, do not look as if they were such fools as to pay their money for nothing. A perplexing feature of the "Irish pharmacy question" is the position taken up by your contemporaries in decrying all attempts to put the law in force against the breakers of the Pharmacy Act in Ireland, while they hound on the dogs of war against the same class in Great Britain. This policy coincides with the small number of offenders in the latter country and the large number in the former, but is in no degree influenced—we are assured—by this circumstance. "It's different in Ireland, don't you know."

If British pharmacists can be induced to take any interest in their brethren here, let them use their influence with their respective Members of Parliament, so as to secure that it will not be a sufficient qualification for a candidate for registration that he knowingly and wilfully infringed the Pharmacy Act, and that he rests his claim on no other grounds.

L. P. S. I.

Communications, Letters, etc., have been received from Messrs. Sawer, Hooper, Morrison, Walton, Grierson, Johnston, Ball, Khalil, Ogle, Dott, Douglas, Mumbray.

SOME SUGGESTIONS FOR THE USE OF LANOLINE IN PHARMACY.

BY A. BALL.

Lanoline, the purified fat of sheep's wool, discovered for use commercially by Liebreich, is now so well known that little need be said about its composition. Its consistence is somewhat elastic and sticky, and in order to make it more pliable it is necessary to dilute it with a substance which will not detract from its penetrating power. What is to be used? is frequently asked in dispensing. The fact that lanoline will take up twice its own weight of an alkaline solution should not be lost sight of. In the preparation of ung. potassii iodidi B.P. with lard, it is first necessary to saponify the lard with potassii carbonas, when the soap will take up the iodide, which is subsequently decomposed again by the soap, iodine being set free, as indicated by the decoloration. With lanoline the case is different, as the solution is perfectly absorbed by the fat. I recently made some experiments with this ointment, prepared with three different bases. No. 1 with equal parts lard and lanoline. No. 2 with equal parts vaseline and lanoline. No. 3 lanoline with 30 per cent. added distilled water.

These ointments were severally spread on pieces of membrane, previously tested as to permeability by dialysing 1 oz. of cochineal solution. After standing twelve hours on the septum no difference in colour could be discerned; the membranes were then washed, and the ointments evenly spread over the surface, to within an inch of the outside. After dialysing for twenty-four hours at 50° F, No. 3 only gave the iodine reaction. I then kept them in a temperature of 80° F. for twenty-four hours, when I found No. 3 gave a copious precipitate, No. 2 less, and No. 1 still less, when tested with nitrate of silver solution, showing that most iodide had passed through the membrane in the case of the lanoline base. Fat had also passed through in each case. I reasoned that if the ointment would pass through a dead membrane it would most certainly pass through a living one, osmosis being the same in each case. Osmotic action has doubtless to perform a most important part in the absorption of medicinal agents when applied as ointments.

Oleates are especially adapted for mixing with lanoline. Dr. Shoemaker very clearly proved the peculiar penetrating properties of the oleic acid preparations, when applied as ointments or dusting powders. Whilst paraffin ointments prevent penetration of the cuticle by forming a superficial varnish on the skin, lanoline assists the osmotic action. For instance, an ointment of oleate of cocaine and lanoline, applied along the course of the nerve in facial neuralgia, quickly relieves the pain, and causes local anæsthesia. Then there is another important point in favour of lanoline, as an excipient in making suppositories of potass. bromid., ext. belladonnæ, acid. carbolici, etc., or any other substance soluble in an equal quantity of water.

The anhydrous lanoline stiffened with cocoanut butter or stearine will make a perfect suppository. First dissolve the medicament; work up with the lanoline and add to the melted cocoa-butter or stearine, and pour into moulds. The suppository is readily melted at body heat; being elastic it is not easily broken, and it is more readily retained in the rectum and quickly absorbed by the membranes. Lanoline may also be used for making "hair cream." If hot water is gradually added to the lanoline in a warm mortar, stirring all the time, any consistency of cream may be obtained. When nicely scented with rosemary oil and otto, with which cantharidin solution (1 gr. in 1 drachm s.v.r., sufficient for Oj.) has been mixed carefully, the preparation will keep well, and render the hair smooth and glossy, besides being less expensive than a mixture of oils.

In conclusion, I would beg to draw attention to the fact, that solutions of salts hitherto non-miscible with lard and paraffin may be easily and perfectly incorporated with lanoline; for instance, solution of potassium permanganate is not reduced. As the lanoline keeps perfectly a long time, no fear of finding the stock of an ointment rancid need ever be entertained.

TEST FOR ANTIPYRIN.

BY A. CAMPBELL STARK.

The now well-known reaction between nitrous acid and antipyrin can be utilized as a test for antipyrin in the following manner.

Place in a test-tube a few grains of potassium nitrate, add a little water, and then excess of strong sulphuric acid, and fill the tube up with the suspected liquid. A green coloration is immediately produced if antipyrin be present. This test is delicate and reliable, and has the advantage of being specifically characteristic of antypyrin.

LESSONS FROM FIELDS AND LANES.

MAY.

If the botanical portion of the Minor examination were conducted during the spring and summer months in any English lane or meadow, one cannot help wondering what would be the result.

The ultimate effect would no doubt be a most desirable one, because it would tend to raise in the mind of the pharmaceutical student a desire to find out whether nature is just as the text-books say, or whether after all living objects decline to conform to the monotony of class-book descriptions.

Such a method could not fail to arouse a certain amount of curiosity, and in the presence of curiosity, healthy and sustained, to learn becomes easy. The proximate result would, we fear, be less satisfactory. The candidate, primed with all the latest "tips" on the "ascent of sap," "the alternation of generations," or "coloured bracts," would immediately collapse if asked why the pilewort flowered before the crowfoots? How it was that the coltsfoot managed to send forth its reproductive organs before the appearance of its bread-winning members? or what prevented self-fertilization taking place in the cuckoo-pint? This and the following articles have been written with the hope of inspiring in the candidate for pharmaceutical honours a love for the plants he meets in his walks, and of furnishing him with some hints how to turn them to account in his studies.

From February on to the end of May one of the most likely plants to attract the attention of the wandering student is the "lesser celandine" (*Ra-*

nunculus Ficaria) or "pilewort." In most lanes and meadows its bright yellow flowers are to be seen peeping out in all directions from amidst cushions of glossy green kidney-shaped leaves. The flower is a marvel of simplicity, all the parts being distinct among themselves and from one another, and all fixed upon the end of the flower stalk or *thalamus*. Because all the parts of the flower spring *separately* from the thalamus the plant is placed in the sub-class or division of Dicotyledons known as *Thalamiflorœ*. A close examination will reveal a calyx composed of three sepals, a corolla of 7–9 pointed petals, an *indefinite* number of stamens, and an apocarpous pistil, that is to say, a pistil composed of separate carpels or fruit leaves, each fruit leaf being rolled in itself and enclosing a single seed. Each of these carpels is, when ripe, known as an achene, and the whole of the achenes forming the ripened pistil are known collectively as an etærio. The indefinite (numerous) stamens show at once that the plant belongs to the natural order *Ranunculaceœ*. The only order that is likely to be confounded with this is *Papaveraceœ*, and here the pistil is syncarpous (carpels joined).

If a specimen be dug up it will be noticed that it has what is known to the botanist as a fasciculated root, a fibrous root in which some of the fibres have become thickened. If much thickening has taken place the root is known as tuberculated, and the thickened fibres as tubercules. The best examples of tubercules are to be found among orchids, which will be noticed afterwards, and in jalap, the tubercules of which form the commercial article. The tubercule, or thickened fibre, must not be confounded with the tuber, which is the thickened extremity of an underground branch, and has on its surface leaf buds, as well seen in the potato and its "eyes." The tubercules give the plant its specific name of *Ficaria*, from their resemblance in shape to a fig, and it is by their help that it is enabled to outrun all its near relations, the buttercups and crowfoots, and appear in all its finery before they awake from their winter sleep. During the early summer months, when the plant is in full growth and food is plentiful, it shows a praiseworthy thoughtfulness for the "rainy day," and lays by in some of its root fibres a stock of starch and albuminous matter. It is this ready-made material which is drawn upon in early spring, when the means of obtaining food are scant, and when its less provident relatives are waiting for the warmth and moisture of the later spring months to fan into life their food-obtaining organs, so as to obtain the energy necessary for the production of flowers.

The celandine, although furnished with all the organs necessary for the production of seed, seldom produces any. Whether this be due to its flowering at an unfavourable time, or to all its surplus food being stored up for the following season, it is impossible to say; but certain it is that the plant is almost entirely propagated by little bulbils, which are formed in the axils of the leaves towards the end of the flowering time and which drop off and produce new plants. The name "celandine" is derived from the Greek *Chelideon*, a swallow, because its time of flowering nearly corresponds to the time of arrival of the swallows. It is perhaps only natural that the simplicity and hopefulness which seem inseparable from this early spring favourite should demand some recognition from our poet friends. Wordsworth has enshrined his love for it in the following lines :—

> "Pansies, lilies, kingcups, daisies,
> Let them live upon their praises;
> Long as there's a sun that sets,
> Primroses will have their glory;
> Long as there are violets,
> They will have a place in story;
> There's a flower that shall be mine,
> 'Tis the little celandine."

A less conspicuous, but no less interesting, plant to be found along with the pilewort is the common "dog's mercury" (*Mercurialis perennis*), another of the wise plants which take some thought for the morrow and its evils. The nourishment in this case, however, is not stored up in the root, but in the stem, which is underground and thickened, and is hence called a *rhizome*. The mercury has flowers which are not complete, and is therefore placed in the sub-class of Dicotyledons known as *Incompletœ*. Its calyx and corolla are merged into a single green floral envelope, which is called a perianth. The flowers are dichogamous, that is, the stamens and pistils are in different flowers. The male and female flowers are on distinct plants, which are therefore said to be dicœcious. Mercury belongs to the same order (*Euphorbiaceœ*) as the castor oil and croton plants, and in many respects resembles them. Castor and croton have also dichogamous flowers, but are monœcious, the male and female flowers being on the same plant. In common with most plants of the order, mercury has an acrid juice. The fertilization of the female flowers by the pollen of the male is effected by the wind, and it will be noticed that the stamens with long slender filaments, the plentiful pollen, and the inconspicuous nature of the perianth, give the breeze every chance of doing its work well.

While hunting among the mercury, if the day be warm and moist and the lane a shady one, the student will probably notice a warm, thyme-like fragrance. This is not due to the wild thyme, nor even to the pharmaceutical thyme or marjoram; these must not be expected for a month or two. A close search among the rank growth of mercury and other upright growing plants will reveal the cause of the odour to be an inconspicuous creeping plant with purple flowers, arranged in clusters of three to six, and kidney-shaped leaves. This is the common ground ivy (*Nepeta Glechoma*). Why it is called ground ivy it is difficult to see, for it is not even a distant relation of the true ivy, and their creeping habit is the only point in which the two plants resemble one another. *Nepeta* belongs to the sub-class of Dicotyledons known as *Corolliflorœ*, *Gamopetalœ*, or *Monopetalœ*, all these names taking their origin in the fact that the petals forming the corolla are joined and the stamens are inserted on them (epipetalous). The corolla, besides being gamopetalous, is two-lipped or labiate, and hence the plant is placed in the order *Labiatœ*, There is another order of Corollifloræ, however, which has sometimes two-lipped flowers, the order Scrophulariaceæ, to which the foxglove belongs, and young students often have difficulty in distinguishing between them. If it be remembered that the keystone of the situation lies in the ovary, confusion is at an end. In Scrophulariaceæ the ovary is two-celled, but in Labiatæ there are four cells, which, when the

ovary has developed into the fruit, separate from one another and form four nutlets. At this stage the ovary exactly resembles a kind of roll, which when in an unbaked condition has had a cross cut on the dough. In the process of baking the dough has swelled up, so as to form four prominences, and a very slight effort suffices to break them off from one another. If one of the flowers of the ground ivy be dissected, it will be noticed that there are two long and two short stamens (di-dynamous). This is frequently the case both in the Labiatæ and foxglove orders. The stem of the ground ivy is known to the botanist as *procumbent*, a word which explains itself. This stem gives off from its under surface, at frequent intervals, roots which are known as adventitious or accidental, because they are not direct prolongations of the primary stem. Unlike the adventitious roots of the true ivy these absorb from the soil the water and salts required in the plant economy. In some situations the stem of the ground ivy becomes almost erect, and this is especially the case where the surrounding herbage is long. All plants require for their leaves a proper supply of light, and if the light has difficulty in reaching them they simplify matters by doing their best to reach it. In such cases it will be noticed that the lower leaves have longer stalks than the upper, an arrangement the simplicity and fitness of which might be imitated to advantage in many social problems affecting ourselves.

To illustrate the *Calyciflorœ*, or fourth sub-class into which Dicotyledons are divided, we cannot do better than linger for a few minutes with that stunted-looking tree, whose attractive masses of white blossom are immediately neutralized on closer acquaintance by the black, spiny, "stand-offish" looking branches. This is the sloe, or blackthorn (*Prunus spinosa*), a near relation of the plum and cherry, and of the hawthorn, "may," or whitethorn. As in the case of many trees which ripen their fruit in an English climate, this one takes time by the forelock, and brings out its tender showy flowers so that there is a chance of getting them fertilized before the leaves come out and hide them. The stamens are indefinite and on the calyx tube, and this it is which places it in the sub-class, Calycifloræ. There are many points of interest connected with this flower and its fruit which are common to other members of the order (*Rosaceœ*) to which it belongs, and which will be noticed in connection with these in a later article.

OLEORESIN OF MALE FERN.*

BY WM. G. GREENAWALT, PH. G.

"Ethereal oil of male fern deposits a sediment. Is this, or the overlying oil, the active portion?" About six years ago this question appeared in the list of queries published by the American Pharmaceutical Association, and thereafter appeared in each successive list for the next two or three years, when it was finally dropped without any investigation having been made.

In the fall of 1885, my attention was called to the query, and I determined to investigate and if possible find which is the active portion. The U.S.P., and all the literature I could find on the subject, concedes to the sediment active properties, directing it to be shaken up with the oil before administration.

The first thing to be done was to separate the sediment from the oil, and for this purpose various liquids were tried, in order to select the best. Chloroform dissolved both oil and sediment, forming a clear liquid. Deodorized benzin and absolute alcohol both seemed to answer very well with the small portion tried; but anxious to know whether there was a difference, I experimented further, and found that after dissolving the oil and decanting, then washing the sediments with the respective liquids until the washings were nearly colourless, and then drying the sediments, that the quantity of sediment from the benzin was much greater than the yield from the alcohol, had more colour, and seemed to consist principally of resinous matter, with a few white specks mixed with the brown powder. The quantity of sediment from the absolute alcohol was comparatively small, and consisted largely of the white portion, with a small quantity of the brown powder.

The quantity of the oil from the benzin was correspondingly smaller, as the yield of sediment was larger than that from the absolute alcohol, and consisted principally of the oil, while that from the alcohol deposited after standing several weeks quite a quantity of resin, which I found to be insoluble in benzin, thus explaining the larger yield of sediment from the benzin.

As I desired to separate the sediment I concluded from the above, that deodorized benzin would be the better liquid, and prepared several doses in this manner.

But after doing all that I could do myself, I experienced a good deal of trouble, owing to the difficulty in getting a physician to aid me who would be willing to experiment with his patient. However, after several disappointments I was enabled to try the virtue of the overlying oil through the kindness of Mr. Frank Greenawalt, then a medical student in our town, who administered the dose of oil on the 19th of June, 1887. The dose was taken at 6 o'clock a.m., the patient having taken no nourishment the previous evening other than a glass of milk, and a glass of milk in the morning. At 8 o'clock, an ounce of castor oil was given, and between the hours of 12 o'clock noon, and 4 o'clock p.m. about 15 feet of tapeworm with the head was passed.

This was certain evidence that there is virtue in the oil; but now the trouble was to test the sediment, and I experienced the same difficulty as before, but finally, after waiting nearly two hours, I had an opportunity to try it, through the kindness of Dr. P. Brough Montgomery, who administered the dose of sediment on the evening of February 8, 1889, the patient having fasted during the day. The next morning a dose of castor oil was taken, and that day 14 yards of tapeworm were passed.

This would show that both the sediment and the overlying oil possess active properties, the sediment being as active as, if not more so, than the oil, and that it could be separated from the nauseating oil and administered with the same result as from a dose of the oil and resin. It has the additional advantage of greater convenience, as the capsules could be filled and kept in stock.

[Although some works of reference give the dose of filicic acid as a tænifuge, and all works direct the oleoresin of male fern to be dispensed with the sediment, references to actual experiments are rarely met with. Bernatzik and Vogl (*Arzneimittel-Lehre*, p. 7) state: "Carlbloom (1866) declared filicic acid to be the therapeutically active substance of male fern, and recommended it as a remedy for cestoda in powder form (dose 0·12 gm.); but it appears to be not the sole active principle, since Rulle (1867) found the impure filicic acid (from the ethereal extract) more active than the pure acid."—*Ed. Amer. Journ. of Pharm.*]

* From the *American Journal of Pharmacy*, April.

THE FIXATION OF NITROGEN DURING SLOW OXIDATION.*

BY M. BERTHELOT.

In pursuing my researches upon the fixation of nitrogen by soil and by plants, the question has suggested itself to me whether the fixation could not take place in the cold during the slow oxidation of certain immediate principles; and especially of those which give rise to intermediary oxides possessing mixed properties, being both oxidizers and oxidizable, fixing free oxygen transitorily in order to transmit it subsequently, and nearly indefinitely to other bodies susceptible of definite oxidation. Instances of such substances are found in ordinary ether, oil of turpentine,† various aromatic carbides,‡ oleic acid, certain aldehydes, etc., all bodies capable of oxidizing indigo, bleaching colouring matter, etc.; in one word, of producing those effects which Schoenbein, who discovered them, attributed to ozone.

In fact, if examination be made of a sample of old ether that has been kept in bottles incompletely filled during several months or years, it is easy to recognize, and the fact is well known, that this ether possesses oxidizing properties towards potassium iodide, for example. If it be shaken with water, the water becomes charged with peroxide of hydrogen, recognizable afterwards by the action of a trace of chromic acid, which develops the blue coloration of perchromic acid, itself separable by ether. But this peroxide of hydrogen does not pre-exist in the anhydrous ether; it is derived, as I have proved, from another principle, peroxide of ethyl, a compound that I have isolated, after having prepared it by the direct and immediate action of ozone,§ and of which I have studied the reactions. Ordinary oxygen also generates it, but slowly.

This is not the only product that can be derived from ether oxidized under the influence of air and light. In fact, if such an ether be agitated with a small quantity of lime water, absolutely free from nitrates,‖ and if the water be evaporated carefully to dryness, the residue, taken up again with a few drops of water and evaporated afresh, gives afterwards with concentrated sulphuric acid mixed with ferrous sulphate the rose coloration characteristic of nitric acid. The blue coloration of phenylamine is also obtained; but this is not specific, and its employment is subject to errors, against which physiologists are not perhaps sufficiently warned. For the blue is also produced by a number of oxidizing substances, and even with peroxide of hydrogen, although faintly. It is also obtained with the water in which oxidized ether has been washed, when evaporated upon a water-bath, with such intensity that in this case it could not be attributed solely to the traces of nitric acid revealed by the ferrous sulphate. It appears to me probable that there exists in such water a third oxidizing principle, but I do not possess sufficient information to refer to it further.

I have repeated these experiments with new ether, well washed with pure water and lime water, then purified and rectified; in short, as pure as I have been able to prepare it. 25 c.c. of this ether was left in a litre flask with 25 c.c. of pure water from the 17th of July to the 26th of October, 1888, at the end of which time the water was separated from the ether. This water, with a little lime water added, was placed in a capsule under a small bell-glass below a titrated solution of sulphuric acid (2 grams SO_3 to the litre) in order to test for ammonia. The quantity found was absolutely none, or less than one-twentieth of a milligram. Search was made afterwards in the same water for nitric acid, of which a trace was found, about the tenth of a milligram, a quantity perfectly perceptible, the reagent showing as little as one-hundredth of a milligram. Finally vapour of the ether was made to pass through a column of soda-lime, some fragments of the same substance being placed also in the small retort containing the ether. There was found 0·6 milligram of ammonia, a quantity approximating very nearly to the limit of error (0·05 milligram). Another similar experiment, made with 25 c.c. of the same ether, preserved in presence of lime water instead of pure water, gave the same result.

Further I have operated in another way. I have taken 50 c.c. of pure ether and caused to pass through it, bubble by bubble, one hundred litres of air purified with the greatest care from all acid or alkaline vapour. On issuing from the ether the air passed through pure lime water. A trace of nitrate was obtained.

Consequently, ether in oxidizing slowly determines also the oxidation of a trace of nitrogen. The phenomenon is comparable to the slow oxidation of phosphorus and to the action of the electric discharge upon the atmosphere, which produces at the same time ozone and a little nitric (or nitrous) acid; a circumstance that formerly gave rise to error in supposing that ozone could oxidize nitrogen in the presence of alkalies, whereas ozone free from nitrous vapour does not oxidize nitrogen.* On the contrary the oxidation of nitrogen takes place really at the same time as the oxidation of phosphorus that produces ozone, or the oxidation of ether that produces peroxide of ethyl. But the quantities of nitric acid so formed are extremely small.

I have sought also to ascertain whether the oxidation of recently rectified oil of turpentine determined the fixation of nitrogen. But in this case it was not possible to have recourse to the characteristic colour reactions of nitric acid, because the products soluble in water of the oxidation of the oil develop in contact with strong sulphuric acid an intense yellow colour which masks everything, and free ammonia is not formed. As to the combined nitrogen the quantity formed by the action of soda-lime at redness with 25 grams of the oil was about 0·2 milligram, that is to say doubtful; the recently rectified oil yields nearly as much.

The same difficulties presented themselves with mesitylene, oil of bitter almonds and oleic acid. In any case, if nitric acid be formed in the oxidation of these substances it would not exceed the quantity observed with ether.

In connection with this subject I have also submitted to a fresh examination the slow oxidation of iron, in order to verify whether there is fixation of nitrogen under the form of ammonia, an opinion that has alternately been affirmed and denied by various observers. 2·7 gram. of pianoforte wire and 10 c.c. of pure wire, left in a two-litre flask hermetically closed, so as to shelter it from atmospheric air, from May 19 to July 9, yielded afterwards $NH_3 = 0·16$ milligram. 4·05 gram of the same wire, left with 50 c.c. of water and 1 gram of chloride of sodium, a condition in which oxidation is more active, yielded $NH_3 = 0·6$ milligram.

Fearing that these traces might be due to some superficial impurity, I changed the water and again poured upon what remained of the second specimen of iron 50 c.c. of water and 1 gram of chloride of sodium. This time I obtained 0·3 milligram of NH_3. These quantities are too small to allow of the conclusion that there is formation of ammonia in the oxidation of moist iron, the doubt being more permissible that iron ordinarily contains traces of combined nitrogen.

* *Comptes Rendus*, March 18, p. 543.
† *Annales de Chimie et de Physique*, [3], lviii., 425, 445.
‡ *Ibid.*, [5], xii., 154.
§ *Ibid.*, [5], xxvii., 229.
‖ This preparation is obtained by washing slaked lime a great number of times by decantation, until 200 c.c. of the lime water, evaporated to dryness, yields no sensible trace of nitrate with diphenylamine and ferrous nitrate.

* *Annales de Chimie*, [5], xii., 442.

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SATURDAY, MAY 25, 1889.

EFFERVESCENT PREPARATIONS AND STAMP DUTY

In the course of the remarks made at the annual meeting on the subject of the medicine stamp duty mention was made of Lamplough's case as illustrating the supposed advantage that would result from fighting out the matter with the Inland Revenue Commissioners. But as the President then took occasion to point out, the success attending the opposition offered in that case was due to the circumstance that the claim of the Inland Revenue to make Lamplough's preparation subject to medicine stamp duty was one that exceeded the provisions of the statutes. At the first trial of the case a decision was given in favour of the Inland Revenue Commissioners, on the ground that the preparation was a medicine within the meaning of the statute, and when the case was subsequently argued before the Lord Chief Baron and Barons CLEASBY and HUDDLESTONE, the Court was divided in opinion on that point. Eventually, on appeal to the Supreme Court of Judicature it was shown that although by the Act of 1812 "all artificial mineral waters and all waters impregnated with soda or mineral alkali or with carbonic acid, and all compositions in a liquid or solid state to be used for the purpose of compounding or making the said waters," were made chargeable with stamp duty, a subsequent enactment did away with that liability. Up to 1833 it was not possible to sell even a seidlitz powder without a stamp, and all kinds of effervescent preparations would have been equally liable ; but the Act of 1833 repealed so much of the schedule of dutiable articles as related to artificial mineral waters and the compositions for preparing them. Therefore the question to be decided in Lamplough's case was whether his preparation was of the character of such compositions, or whether, as the Commissioners of Inland Revenue held, it was a medicament for the relief or cure of disease. In a sense, all mineral waters that are of any value contain substances that have a medicinal action, but artificial mineral waters containing such medicinal substances as are specified by the Act of 1833 are exempted from liability to stamp duty, and on that clear ground the original decision was reversed and Lamplough's preparation, as well as all others of the kind, were held to be exempt. No equally clear case for offering opposition to the views of the Inland Revenue authorities has been made out in regard to other medicinal preparations. Even in the case of effervescent preparations it seems probable that these may become liable to stamp duty if they are made the vehicle for the administration of medicinal substances of a nature distinct from that specified in the schedule to the Acts, for as we learn from a correspondent it is held in such a case that the effervescent preparation, though in itself exempt, is to be regarded not as a composition for making an artificial mineral water, but, on account of the added ingredients, as a special medicine for the relief or cure of disease, and if it be also recommended or those purposes there would be the greater reason for taking that view.

The inconveniences attending the designation, according to the most improved methods of chemical nomenclature, of some of the organic substances recently introduced into the materia medica are very evident. But in a recent communication to a French contemporary it has been pointed out by M. Jungfleisch that the alternative of adopting more or less fancy names is not without its disadvantages. In the first place it has the defect of associating the supply of the article with a name that may acquire the force of a trade mark, and favour the establishment of a monopoly in an otherwise unprotected compound, or the perpetuation of one long after any patent rights may have expired. In addition M. Jungfleisch considers the use of names indicating the supposed qualities of a compound is a reversion to a practice long abandoned. On the other hand he thinks the proper chemical term has the advantage of indicating definitely a particular substance, and that this more than compensates for the relative disparity in cumbrousness, which is really not always so great as might be supposed.

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It is known that this question of the creation of proprietary rights by the adoption of trivial names has excited some attention in France, where the law does not recognize any force in a patent applying to the production of a medicinal substance, the question being raised whether when an article is ordered under its trivial name the known chemical equivalent obtained from any other manufacturer than the owner of the trade-mark might not be supplied. A commission to which the subject was referred by the Academy of Medicine has, however, been advised by counsel that the adoption for a medicine of a special name not drawn from chemical nomenclature constitutes a trade mark applying to that article, and that such names as antipyrine, sulphonal and antifebrin are trade marks that would be protected by French law. The commission, in its report to the Academy, with an evident desire to circumvent this trade mark difficulty, proposes to draw a distinction between the scientific and the commercial aspects of the question. It expresses the opinion that when a prescriber orders one of these compounds under its trivial name, he is not performing a commercial act, and that therefore, if he does not indicate any particular maker, the pharmacist is at liberty to use the substance that is represented by the name. For instance, when "antipyrine" simply is ordered without a maker's name, the commission considers the pharmacist is at liberty to dispense dimethyloxyquinizine from any source whatever. This opinion, which was supported by reference to some rather far-fetched analogies between "antipyrine" and Glauber's salt, was adopted unanimously by the Academy.

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In our last number we announced the institution of a course in practical pharmacy in the Medical Department of the Yorkshire College, Leeds, being one of the three colleges constituting the Victoria University. As our allusion might give the impression that this course included the instruction of pharmaceutical students, we should explain that it is provided solely in the interests of students in medicine.

Pharmaceutical Society of Ireland.

SPECIAL MEETING OF THE COUNCIL.

On Monday, the 13th inst., a special meeting of the Council of this Society was held at their rooms, No. 11, Harcourt Street, Dublin, at three o'clock, for the purpose of considering a report of the result of a conference held on the 7th inst., between the Law Committee of the Council and representatives of the Chemists and Druggists' Association of Ireland as to the proposed Pharmacy Act Amendment Bill.

Present—The President, Mr. James E. Brunker, M.A. (in the chair); the Vice-President (Mr. Draper), Messrs. Allen, Baxter, of Coleraine; Merrin, Doran, Sumner, of Cork; Mr. Cormack, Beggs, Wells, Hodgson, Grindley and Hayes.

The report from the Conference was as follows:—

"In *re* Pharmacy Act Amendment Bill. Memorandum of Conference held May 7, 1889, between Law Committee of the Council and representatives of the Chemists' and Druggists' Association. After prolonged discussion, it was agreed to recommend to the respective bodies represented—

"That the Bill, as amended in December last, be adopted with the following modifications:—

"*Clause* 4.—The title of the new grade to be 'registered druggist,' except in the cases of persons in business as principals prior to January 1, 1888, who are to be styled 'chemists and druggists.'

"*Clause* 5.—Chemists and druggists in business as principals, and their assistants of seven years' standing, before January 1, 1888, to be registered without examination. All others to be examined.

"A registered druggist to serve *two* years as assistant to a pharmaceutical chemist, besides complying with other usual conditions, to entitle him to present himself for the examination of pharmaceutical chemists."

The President said—Gentlemen, I am very much obliged to you for attending in such numbers. I regret to have been obliged to call a special meeting so soon again, but this is a most important meeting and every day is valuable to us at present. Those of you who were here on last Monday week are aware—and those who were not here have doubtless read in the report in the Journal—that when we separated we did not know whether the intended conference would come off or not. Two or three days afterwards we heard that Sir James Hazlett would make an effort to come to town. On hearing that I called a meeting of the Law Committee, which took place on last Tuesday. The Law Committee was pretty fully represented, only Mr. Evans, who is away from home, being absent. The Chemists' and Druggists' Association was represented by four gentlemen from Belfast and four belonging to Dublin. We did not go through the entire of the proposed Bill, but deemed it sufficient to discuss the points in dispute. The two main points on which there were differences outstanding between the Council and the chemists and druggists were, first, the educational test, which was to be imposed on those who were to be registered under the new Bill, and secondly the title that those registered persons were to have. After a very full discussion, the representatives of the chemists and druggists maintaining their views very strongly, it came to a question as to whether they would give way on the titles question or the educational test. So far as I am concerned I would very much rather that they had given way on the educational test, but they would not. Rather than do so they gave way on that as to the title to be given to those who should be registered after the 1st of January, 1881. They maintained very strongly—and it is not for me to say now whether their argument is good or bad—that those who were in business before the passing of the Act of 1875 and those who were allowed to go into business afterwards through failure on the part of the Society to enforce the provisions of that Act, up to January 1, 1888, having called themselves "chemists and druggists" during that period had a vested right to that title, and that it should be continued to them. The agreement that was come to—subject to confirmation by the Council—was, that those who were entitled to be registered up to January 1, 1888, should be registered as "chemists and druggists," and that all others should be registered afterwards as "druggists." On the other hand, it was agreed that all who were in business before January 1, 1888, shall be entitled to be registered without any examination, but that all those who went into business after that date, and also all apprentices and assistants in the future should, in order to get on the registry, be subjected to a modified educational test. A new point, which did not enter into the arrangements of last year, had reference to assistants who were in business before 1875 and up to 1888. It was contended that assistants who had been some time in business at the date 1888 should be entitled to stand on the same footing, as regarded their right to be registered as those who were actually in business during the same period. The claim was admitted by the Committee to be a fair one, and it was agreed to recommend that persons who had prior to January 1888 served seven years as assistants, and apprenticeship was considered to be included in the seven years, should be entitled to be registered without examination, but only as "druggists," as they had no vested interest in the other title. The only other point conceded by the representatives of the chemists and druggists was as to the time a druggist should serve, in order to entitle him to be registered as a pharmaceutical chemist. The amendment of last year was that after one year's service to a pharmaceutical chemist or licentiate apothecary, and upon compliance with all the other regulations in force regarding examinations, he should be entitled to present himself for examination as a pharmaceutical chemist.

Mr. Beggs: Was the Law Committee unanimous about these points?

The President: They agreed, pending the confirmation of them by the Council.

Mr. Wells said he was sorry so soon to show a certain amount of opposition, but he was very much surprised when he received the notice calling that meeting and the accompanying memorandum. It would be remembered by every gentleman present at the Law Committee that before they met those gentlemen at all it was distinctly stated that as regarded anything that should be discussed or talked of they would be bound to nothing whatever.

The President: Certainly.

Mr. Wells: And then as soon as the meeting of the Law Committee was over we discussed these matters pretty largely, as you have stated. Sir James Hazlett was told that you and a large number of members of the Council were very strong as to the educational test, and did not see your way to giving way upon it. Sir James Hazlett said they would not give way either. We then passed from that without any definite settlement. We then took up the matter of the titles, and I opposed the granting of the title "chemist and druggist" to them. You then said, would they not give way on one of those two points, and you said you would do your utmost with the Council to get them to give up the educational test if they would give up the title.

The Vice-President: Most emphatically not.

The President: Certainly not.

The Vice-President: That is a direct misstatement.

The President: The way in which I put it to Sir James Hazlett was this. Here are two points on which we differ. It is useless for me to go to the Council unless we can come to a compromise with

respect to them. On which of them are you inclined to give way? After considerable discussion the sense of the arrangement made was, as I understood, what is printed here.

Mr. Wells: Well, allow me to proceed. I am under the impression—and I think I will be backed up—that we never came to any agreement that we would recommend what is here. I would not agree to it, and I did not. I opposed the granting of the title of chemist to them. According to what is here they have given up neither the one point nor the other. Mr. Hayes very fully laid the matter before them, saying that the Council was not unanimous, but that if they would give way on the titles question we would see our way to give way on the other point. I say that before we left this room the other side did not agree to anything, for Sir James Hazlett distinctly said, "We have behind our backs the chemists and druggists."

The President: Certainly; and so had we this Council behind our backs. That is why we are here to-day.

Mr. Wells: And he also said that the chemists and druggists of the north would not give way on the question of the titles.

The Vice-President: You seem to forget that we are here to consider those things which were only provisionally accepted by the Law Committee.

Mr. Wells: With all respect to you, they were not agreed to by the Law Committee.

The Vice-President: You never raised a dissentient voice against them. We all fought as hard as we could, but we let them go away under the impression that we would recommend these things to the Council to-day.

The President: You are raising an absurd point. I distinctly said to Sir James Hazlett, before the proceedings commenced, that anything that we did would be subject to consideration and confirmation by the Council; and the reply of Sir James Hazlett was that if the Law Committee held themselves open in that way, the representatives of the chemists and druggists would hold themselves equally open to lay the conclusions come to before their constituents, so as to give them their veto, just as the Council has its veto, if it does not approve of what was done. If you dispute the accuracy of what is on the memorandum it is a different thing.

Mr. Wells: I do most emphatically.

The President: But the Council are not yet bound by anything that occurred the other day.

Mr. Hayes: Perhaps I may be able to reconcile the difference of opinion on this matter. When I looked at this memorandum I at once saw that there was a mistake in it. If the gentlemen who waited on us were to see it they would say that the Council was giving them far more than they asked for.

The President: In what respect?

Mr. Hayes: It says with respect to Clause 4 that the title of the new grade is to be "registered druggist," except in the case of persons in business as principals prior to January 1, 1888, who are to be styled "chemists and druggists." That was not what we agreed to. The deputation understood that we would only give the title "chemist and druggist" to persons who were in business up to 1875.

The President: I am open to correction, but the impression on my mind is that it was what was in the memorandum.

Mr. Allen: That is my impression too.

Mr. Wells: Mr. Hayes has taken the view that I do.

The Vice-President: It would be uncandid on my part if I did not say that my impression is that the President misconceived that matter.

Mr. Allen: My recollection is that we agreed to register all up to January, 1888, as "chemists and druggists." I went away with that distinct impression on my mind.

Mr. Merrin: I went away with the impression that it was 1875.

Mr. Grindley: I do not think any report from that meeting comes before us officially at all. I for one did not enter into the discussion with the intention of binding myself to anything.

Mr. Hayes: I do not think any of us bound ourselves to anything, but there was a tacit understanding that the deputations would recommend their respective societies to adopt the principles that we laid down; and we as far as we could pledged ourselves—I know I did—to endeavour to induce the Council to adopt those principles.

Mr. Beggs: Is not this a very important matter to be brought forward at a day's notice? Will we get legislation this year if these recommendations are passed?

Mr. Merrin: No, we will not.

The President: That is begging the question.

Mr. Hayes: We all agreed that it should be done as quickly as possible. Have you the Draft Bill?

The President: Yes.

Mr. Hayes: Do not you think we should go through it?

The President: That is the course I propose to take.

Mr. Beggs: Would it not be better to print and circulate the Bill first amongst the members outside who have not seen it? I for one certainly object to a matter like this being sprung on the meeting.

Mr. Merrin: I have not seen the draft of the Bill either.

The President: Is there any member of the Council who is not familiar with the amendments that we adopted last December? [No answer.]

Mr. Wells: Have we any letter from these gentlemen? We are now going to discuss this matter, and they may afterwards write saying that they will not agree.

Mr. Hayes: I think we should look at the matter calmly. We are all anxious to come to a point. Sir James Hazlett said it was not likely that we would be able to press the Bill through this year; at the same time we agreed that we would endeavour to do so; that we would call the Council together and put matters into such a shape as to endeavour to have it done.

Mr. Beggs: At the last meeting we were told that we should put our dignity in our pocket and meet those Belfast gentlemen, and we said that we would not, and consequently they came to us.

The President: There was no such expression used at this table as "putting our dignity in our pocket." In order to arrive at something I propose that we should go through the Bill clause by clause. If you think you are not ready to do that, simply say so.

Mr. Hodgson: It will take a very long time for us to go through all the clauses.

The President: Some of the clauses are word for word the same as those in our Bill of last year.

Mr. Hayes: Has not the principle of the Bill been adopted except as to a few clauses? Let us come to a conclusion on those clauses and then adopt the rest of the Bill. There is some difference of opinion as to whether the title "chemist and druggist" is to expire in 1875 or not until 1888.

The Vice-President said he thought the memorandum should be modified as to clause 4.

The President: Then as to clause 4 the memorandum will read, "The title of the new grade to be 'registered druggist,' except in the cases of persons in business as principals prior to the passing of the principal Act, who are to be styled 'chemists and druggists.'" I would be glad to hear any discussion on this.

Mr. Beggs: I propose that the discussion be adjourned until the Bill is printed.

Mr. Wells: What is the advantage of hurrying the matter?

The Vice-President: We are bound to give these gentlemen of Belfast and Dublin some reply.

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Mr. Hodgson: The matter has been quite long enough before us and we ought to deal with it at once.

Mr. Wells: The President sent me a copy of the Bill on Saturday afternoon, but I have not gone through it.

Mr. Beggs moved, "That the proposed new Bill be printed and circulated amongst the members and considered at the next monthly meeting of the Council, and that no discussion take place on the Bill to day."

Mr. Merrin seconded the above, which was put and negatived by 8 votes to 5.

Mr. Hodgson moved that only the clauses of the Bill that had been submitted by the Law Committee be gone into.

Mr. Hayes seconded the above, which was carried by a majority.

The President again asked did anyone wish to speak to the modified recommendation as to Clause 4.

Mr. Baxter: You have altered the date from 1888 to 1875?

The President: Yes. That appears to be the impression of the majority. Has anyone any objection to that? There should be a separate register for those "chemists and druggists." In order to prevent confusion and the possibility of a "registered druggist" calling himself a "registered chemist and druggist," it will be necessary to have two separate registers.

The Vice-President: I wish to record my impression of what happened at the meeting of the Law Committee. It was this, that all were to be "registered druggists," but that we had no power to interfere with the title of the men who were in business prior to 1875 to be called "chemists and druggists."

Mr. Wells: If they are registered as "chemists and druggists" is there any possibility of their claiming to be dispensers?

The President: Certainly not. My proposition to have a second register for chemists and druggists is simply to prevent confusion by having a list of these chemists and druggists, so that no other person can assume that title. Besides, it will help to smooth down the opposition that we must be prepared to meet.

Mr. Wells: Would it not do as well to register them as "registered druggists?"

The President: If they are to have a right to the title we had better give it to them in full.

Mr. Hayes: It would be against ourselves as a registering body not to have the title that they claim put down for them.

The President then put the amended recommendation as to Clause 4 of the proposed Bill and it was unanimously agreed to.

The President said the recommendation as to Clause 5 was that chemists and druggists in business as principals, and their assistants of seven years' standing before the 1st of January, 1888, should be registered without examination, and that all others should be examined. The original contention of the representatives of the chemists and druggists was that all who should be in business at the time of the passing of the intended Act should be registered without examination. Sir James Hazlitt said that Parliament would not give the Council power to examine men who were in business before the date of the passing of the intended Act; but he (the President) did not admit that contention, because he believed that if the parties were unanimous on the subject Parliament would give the Council power to impose such conditions with respect to the registration of men who were at present not entitled to be registered, as the Council could show good grounds for. However, the chemists and druggists had allowed that examination should go back to the 1st of January, 1888, on the ground that the attempt to legislate commenced in 1888, and that the Council could fairly claim to examine any men who had gone into business since. With regard to "assistants of seven years' standing," it was agreed that those words should include apprenticeship, but that the seven years should have been passed before the 1st of January, 1888.

Mr. Wells: I will not vote for this; I think it is hardly fair. You have men whose rights have been preserved to them, and you have a lot of men who have gone into business since, and who have no rights whatever. You propose to let these men have a title without examination. I think that every man who is to be registered should undergo an examination. You were very strong yourself on the subject the other day. It is a very modified examination, and people not able to pass it should not be allowed to retail poisons. Those people have in our opinion been breaking the law, and they will be getting off very easily by being registered on passing such an examination. There is no use in thinking that we are unanimous about this. A body of pharmaceutical chemists are determined, if this clause is passed, to oppose the Bill, so that you may put out of the question the idea of getting a Bill this year at all.

The President: Does any other gentleman wish to say anything on this? Of course there is a great deal in what Mr. Wells says, and if we could have everything our own way, instead of being obliged to meet our opponents and argue with them in the gate, I for one would rather have held out for the educational test than for the title, which is not a matter of importance. However, it was not to be. It was put to our opponents as a matter of compromise to say on which point they would give way. On that as to title they gave way; on this they held their ground. I am not prepared to sacrifice everything by holding out, and am therefore satisfied to accept the alteration as agreed to the other day.

Mr. Hayes: Sir James Hazlett said that if we go to Parliament for retrospective powers on this point we would be throwing our money into the sea.

The President: I think we could get them.

Mr. Wells: If we could get them as far back as 1888 could we not go farther back?

The President: The attempt to legislate commenced in 1888, and anyone who went into business after January 1 in that year did so with his eyes open and conscious of the danger that he incurred.

Mr. Merrin: I think it would be enough to register the principals without the assistants.

The President: If we were a House of Commons ourselves we could do a great many things, but we are not in that position, and what is more, we are on the weaker side of the controversy. It must be ended sooner or later, or the Society cannot carry on.

The Vice-President: No argument was left unused to Sir James Hazlett in favour of getting some educational test, however slight, but he did not take it as a matter personal to themselves, but as a Parliamentary matter entirely.

Mr. Hodgson: This clause is one on which the chemists and druggists are firm. We must either accept or decline it, and if we decline it, I take it that the whole negotiation is up.

The President then put the clause as recommended by the Law Committee, and it was approved of by 8 votes to 5.

The President: The next point is one on which there is no controversy. The chemists and druggists have admitted that there should be two years' apprenticeship to a pharmaceutical chemist. They objected to the title "apprentice," but agree to that of "assistant." Practically speaking, I do not think there will be such a thing as an apprentice, for men intending to be registered druggists will not go as apprentices. In the amendment agreed upon last year the time fixed upon was only one year. I take it that there is no difference of opinion about this.

The recommendation was unanimously approved of.

The President: On going through this Draft Bill for the purpose of making a few alterations necessary to bring it into unison with the recommendations, I found that Clauses 10 and 11 of our Bill, which gave us the annual fee of 10*s.* 6*d.*, were omitted from it. That subject was very fully discussed by me with Sir James Hazlett in Belfast. I told him that we could not do without that 10*s.* 6*d.*, as an annual income was essential. I was so absolutely certain that the clause was still part of the Bill that I did not raise the point the other day. I have written to Sir James Hazlett, saying that I suppose the omission of the clause is an oversight.

Mr. Wells: I thought that is what we are having the Bill for.

Mr. Doran: Is there any intention of asking the Government to undertake prosecutions as they do in Germany and elsewhere?

The President: No. It has been suggested that the Government should be asked to impose a licensing fee, but that would be only offering them a white elephant, for it would only bring in £200 or £300 a year, and would involve them in very considerable expense.

Mr. Doran: As the public are protected by the Society, I think the Government ought to bear the cost of doing it.

Mr. Wells: I think the Bill ought to be printed before the next meeting of the Council.

Mr. Hayes: No doubt we could not accept the Bill at all unless we get the fee.

The President: Certainly not. I told Sir James Hazlett and Mr. Boyd so. It is possible that when we get before committee in Parliament it will be knocked off, and then we must claim a *quid pro quo* with other fees.

Mr. Hayes: In order to save time I suggest that the President, the Vice-President, Mr. Allen and Mr. Wells go through the Bill and make the necessary verbal alterations in it before it is printed.

Mr. Wells: Of course to come before the Council afterwards.

The President: Time is of the greatest importance, and if we were merely to order the Bill to be printed as it is and brought up at the next meeting it would have to be reprinted afterwards, and in the meantime we might find that a Bill without any alterations had been introduced into the House of Commons.

Mr. Hayes: In doing that will you introduce into the Bill you get printed, and a copy of which you will send to our friends in Belfast, those money clauses?

The President: Certainly.

The Vice-President: And in the meantime you will communicate to the chemists and druggists the acceptance of the other clauses by the Council?

The President: Yes. I would ask the Council to pass a special resolution that clauses 10 and 11 relating to the annual fee should be re-introduced.

On the motion of Mr. Hayes seconded by Mr. Allen a resolution was passed declaring that it was absolutely essential that those clauses should be reinserted in the Bill.

The Council then adjourned.

Proceedings of Societies in London.

ROYAL INSTITUTION.

Iridescent Crystals.

On Friday, the 12th of April, a lecture was given by Lord Rayleigh on iridescent crystals, the crystals more particularly treated of being chlorate of potash. When large quantities of this salt are crystallized, a very small portion of the crystals, one here and there, is found to be beautifully iridescent, displaying very brilliant colours in certain lights. It has been shown by Professor Stokes that these colours are caused by reflection of the light from thin plates or layers in the crystal. Thin being a comparative term, the lecturer explained that in this case it meant that the thickness must be less than the wave-length of light, about the thousandth part of an inch. With such thin layers the phenomena of "interference" are produced, as in the thin films of soap bubbles. Part of the light falling on the film is reflected from the nearest surface, and another part after passing into the film is reflected from the further surface, thus passing twice through the thickness of the film; moreover, as the wave is reflected from the further surface in the opposite phase, it is retarded behind the one reflected from the first surface by twice the thickness of the film, plus half a wave length. If this retardation is just equal to a wave length of any particular light, the wave first reflected will be reinforced by the second, as each crest of the second series of undulations will coincide with a crest of the first; but if the retardation is only half a wave length, the first series will be neutralized by the second, as each crest of the second will coincide with a hollow of the first. In the case, therefore, of white light, a mixture of various wave-lengths, falling on such a film, only those reflected rays will be seen whose wave-lengths coincide with the retardation produced by that particular thickness of film. In order that reflection may take place, two conditions are necessary; first, a sufficient difference of optical density; secondly, the transition from the one medium to the other must take place with sufficient suddenness. The first condition was illustrated by transmitting a beam of light through a bottle of powdered glass, which would be quite opaque through reflecting and scattering the whole of the light, but the interstices being filled with a mixture of benzene and carbon bisulphide of the same refractive index as the glass, the light was almost entirely transmitted, or rather the refractive index being the same for green light only the green portion of the light was transmitted. The second of these conditions could not be fulfilled by atmospheric strata, as the transition from dry air to moist air, or from warm air to cold air, could not possibly be sudden enough to produce reflection. The phenomena of interference are often met with in very old glass, and some very beautiful examples of this were shown, the colours being very pure and brilliant. With the iridescent chlorate of potash crystals it was shown that if the plane which would contain the incident and reflected rays coincides with the axis of symmetry of the crystal, no reflection takes place, the light all going through whatever the incident angle may be; but if the plane of the incident and reflected rays is perpendicular to the axis of symmetry, then reflection takes place, and is greater as the angle is more grazing to the surface, the colour also changing from red to yellow, green, etc., as well as becoming brighter with the increase of the angle. Moreover, if the incident light is polarized, the plane of polarization is reversed during the reflection, so that the plane of polarization of the reflected ray is at right angles to that of the incident ray. The reflected light from these crystals is often extremely pure and mono-chromatic, and the lecturer's investigations had led him to the conclusion that this was the result of reflection from a series of layers of equal thickness. The nature of the layers was probably analogous to the structure of twinned crystals, where the axis of one part of the crystal was turned to form an angle with that of the other part, as observed by Brewster in crystals of Iceland spar. The properties of the chlorate of potash crystals pointed to the conclusion that they must contain a series of layers alternately twinned. The appearance of these layers would be very interesting if they could

be distinguished by the microscope, but, however much microscopes might be improved, their resolving powers must be absolutely limited by the wave-length of light, and these layers approached that limit. The fact that the reflection of a particular kind of light is effected by a series of layers of equal thickness, which thickness is equal to the wave-length or a multiple of the wave-length of that light, was shown by an acoustical analogue. The note of a "bird-call," too high to be audible, but rendered evident by the behaviour of a sensitive flame was employed, as its wave-length could be rendered evident to an audience. With a series of cardboard diaphragms, whose distances apart could be equally increased, it was shown that on uniformly increasing their distance the flame was affected each time the distance became a multiple of the wave-length.

Another phenomenon is shown by crystals of chlorate of potash which have been heated to a point a little short of fusion, and then allowed to cool again; they then reflect a silvery lustre different from the coloured iridescence of the others. The effect disappears on heating, to reappear on cooling. The altered character of the reflection is probably due to the distances between the layers not being equal, and there being consequently no selective action for any particular colour. It is also possible to produce twinned layers by mechanical means, as by pressure carefully applied in a suitable direction to a crystal of Iceland spar. The iridescence of opals, which has been investigated by Crookes, is probably not due to alternately twinned layers, as the colour in the opal undergoes no change on rotating it. It is more probably due to the presence of thin layers of air, and if there is any truth in the idea that the lustre of an opal is affected by atmospheric conditions, the effect could be explained by the alteration produced in the layers of air in the gem.

Aluminium.

On Friday, the 3rd inst., Sir H. E. Roscoe delivered a lecture on aluminium. He premised that he had no new discovery to bring forward, but that he purposed giving an account of the revolution that had been effected in the industrial production of this metal, which when previously shown at the Royal Institution, at a lecture in 1856, cost about £3 per ounce, and which was now sold at 20*s.* per pound. Davy was the first to attempt to obtain aluminium by electrolysis of its oxide in the same way that he obtained the metals of the alkalies and alkaline earths, but his efforts were not successful. It was in Denmark, in 1824, that Oersted pointed out a method by which it could be obtained, the same in principle that has been employed ever since, viz., the reduction of the chloride by metallic potassium or sodium. He, however, only obtained a mere trace, and it was Wöhler who subsequently obtained it in sufficient quantity to examine its character and properties. In 1854, Deville originated the practical method by which all the metal has, up till the last year or two, been produced. This method has been chiefly worked in France, and the annual output has been about 10,000 pounds. Now, however, the Castner Manufacturing Company are producing it at the rate of 100,000 pounds per annum. This difference is mainly due to improvements in the manufacture of sodium, which cost 4*s.* per ounce in 1856, and which now costs less than 4*s.* per pound. Up to recent years the great cost of sodium has been due to the rapid destruction of the plant by the extremely high temperature necessary for the reduction of the carbonate by carbon in the ordinary process. By the improved process of Mr. Castner a very much lower temperature is sufficient; in this process fused caustic soda is brought into intimate contact with carbon in the form of iron carbide, the reaction being $4NaHO + FeC_2 = Na_2CO_3 + Fe + 2H_2 + CO + Na_2$. The charge of caustic soda and iron carbide is put into large iron pots which are raised by a hydraulic lift into position in the furnace, and then fit tightly against a still-head, which carries off the sodium vapour and gases, the sodium condensing and running off through an aperture at the bottom, while the gases pass on and burn at the mouth of the tube. In this way four furnaces yield 120 lbs. of sodium at each operation, which lasts an hour and ten minutes, so that they can produce no less than a ton of sodium every twenty-four hours. The double chloride of aluminium and sodium is prepared by passing chlorine from lead-lined gas-holders over a red-hot mixture of aluminium hydrate, common salt, and powdered wood charcoal, contained in earthern retorts heated by gas, when the chloride distils. From 1600 to 1800 lbs. are obtained at each operation, which lasts seventy-two hours. This chloride is always contaminated by iron, which it is very important to get rid of, as it takes 10 pounds of double chloride to produce 1 pound of metal, and if the chloride contained 1 per cent. the metal would contain 10 per cent. It has been found that the fusing point of the pure double chloride instead of being from 170° to 180°, as hitherto supposed, is only from 125° to 130°. In the final stage of the process, a charge of 1200 pounds of the double chloride, and 800 pounds of sodium, with some cryolite to act as a flux, is well mixed in a revolving drum, and transferred to a truck which conveys it to the furnace; a violent reaction takes place, and the aluminium sinks to the bottom, with a layer of flux protecting it, and is drawn off in the usual way. It is very pure, containing 99·2 per cent. of aluminium, the traces of impurity being silicon and iron. The lecturer exhibited models showing the comparative amounts of substances necessary for the production of the aluminium. In figures they would be as follows:— To produce one ton of aluminium requires 6300 pounds of sodium, 22,400 pounds of double chloride, 8000 pounds of cryolite, and 8 tons of coal. To produce the 6300 pounds of sodium requires 44,000 of caustic soda, 7000 pounds of carbide (made from 12,000 pounds of pitch), $2\frac{1}{2}$ tons of crucible castings, and 75 tons of coal. To produce the 10 tons of double chloride requires 8000 pounds of salt, 11,000 of alumina, 15,000 pounds of chlorine, and 180 tons of coal. In conclusion, the valuable properties and uses of the metal were described and illustrated. Among other of its applications, an alloy with iron, called ferro-aluminium, is largely used for adding to steel castings, as a very small proportion of aluminium is found to considerably lower the fusing point of steel, and so facilitate casting.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, April 25, Mr. W. L. Williams, Vice-President, in the chair.

The following paper was first read:—

Combustion in Moist and Dry Oxygen.

BY R. HARDING BREMRIDGE.

Combustion holds such an important position, not only in the history and advance of chemistry, but also in the application of the science to industry, that special interest is attached to the discovery of the chemical changes therein involved. The phenomena presented in the burning of phosphorus, sulphur, and carbon are known to all, as typical of those which are found in other processes of burning. With the object of determining the conditions necessary for the oxidation of these three substances, Brereton Baker, a scholar of Baliol College, Oxford, undertook an investigation. That water vapour might play an important part in such actions seemed very probable.

In the first experiments on the combustion of carbon in oxygen wood charcoal was employed. Since hydrogen, both occluded and combined, greatly facilitates the combination of carbon with dried oxygen, the charcoal before use was heated in a current of chlorine in order to free it from hydrogen. The carbon thus purified was then put into tubes containing phosphorus pentoxide; oxygen dried by sulphuric acid was passed through and the tubes then sealed at both ends. After standing some days these tubes were heated, but the carbon appeared to remain unaltered. On examining, however, the contents of the tubes it was found that a certain quantity of carbon had been burnt. Carbon was then sealed up in tubes filled with moist oxygen. On heat being applied the carbon burnt with scintillations.

The following are the results of the analysis of the gaseous contents of the tubes after the carbon had been heated to redness in them for about two minutes:—

	1 week.	2 weeks.	16 weeks.
Wet—			
CO_2	69·3	62·0	67·5
CO	30·7	38·0	32·4
Dried—			
CO_2	20	23·8	22·4
CO	26·6	18·5	20·8
O	53·4	57·7	56·7

It will be noticed that a large quantity of free oxygen was always found in the dry tubes, but none in the wet. The large quantities of carbon monoxide produced are also very striking, especially when it is remembered that the temperature was not high, and that the reduction of carbon dioxide by carbon is never rapid. It will also be noticed that the quantity of carbon monoxide formed in the dry tubes is greater in proportion to the amount of combustion than in the wet tubes. The presence of free O and the comparatively large quantities of CO show the combustion to have been very incomplete in the dry tubes. Also the presence of CO (since the temperature was too low for the reduction of CO_2) seems to point to the fact that perhaps carbon first burns to carbon monoxide, and then unless prevented by dryness or some other cause produces carbon dioxide. Experiments to investigate this supposition were carried on. The carbon used in these experiments was prepared by heating sugar in a silver dish to a bright red heat.

The porous mass was then extracted, broken up and finely powdered. It was transferred to a combustion tube and then heated to redness in a current of chlorine dried by sulphuric acid to eliminate any hydrogen. The charcoal was then washed with water until the washings gave no opalescence with silver nitrate. To free from any occluded hydrogen chloride it was placed in a hard glass tube sealed at one end, while at the other end was placed a stick of caustic potash. The tube was then exhausted by a Sprengel, and the end containing the carbon heated to redness. After this treatment the carbon was considered sufficiently pure for the experiments.

Experiment I.—Oxygen dried by P_2O_5 was passed over the charcoal contained in a hard glass tube and heated to dull redness by a Bunsen burner. After 200 c.c. of oxygen had been rapidly passed over the charcoal, a sample of the gas issuing from the end of the tube was collected, analysed, and found to contain:—

CO_2	5 per cent.
CO	4 „
O	54·9 „

Experiment II.—Oxygen which had been drying for 6 days more was then passed over charcoal raised to a bright red heat by a blowpipe. No visible combustion occurred. A sample of the gas was analysed and found to contain:—

CO_2	2·2 per cent.
CO	39·5 „
O	58·1 „

These analyses show that a large quantity of CO is produced even when the oxygen is in excess, and that the dryer the gas the greater the proportion of CO formed. Experiments also show that this is the case when carbon is heated in a stream of O at temperatures at which dry carbon dioxide is not reduced by carbon. The carbon monoxide must therefore be produced by the direct union of its elements, its further oxidation being prevented by the dryness of the gases. Pure charcoal, then, heated in oxygen dried by P_2O_5 does not burn with a flame. Partial combustion, however, goes on, both CO and CO_2 being formed. We have also learnt that in the first stage of the combustion of carbon CO is formed, and that this, if the gas and apparatus be dry, is prevented from burning to produce CO_2.

The next part of the subject is concerned with sulphur. In anticipation it may be said that the results obtained were very similar to those just considered. Sulphur combined very readily with moist oxygen, but not with dry. In the preliminary experiments the sulphur was purified by repeated sublimations.

Experiment I.—Sulphur was placed at one end of a tube filled with oxygen, P_2O_5 being placed at the other to dry the gas. The tube was then sealed and left to dry. A similar tube contained sulphur in moist oxygen. On heating these two tubes side by side, a sudden explosion was seen in the moist tube after the sulphur had melted. A few seconds after, a small blue flame appeared on the surface of the dry sulphur, but was soon extinguished. On analysing the contents of the two tubes oxygen was found in the free state in the dry tube, but not in the moist. Since the sulphur used above might contain hydrogen, it was purified as follows:—Some powdered sulphur was melted and distilled in an atmosphere of chloride of sulphur vapour. Some hydrochloric acid was formed, showing that hydrogen was contained in the sample of sulphur used. The distilled sulphur was then transferred to a tube, one end of which was sealed, while the other was connected with a water pump, which maintained a nearly complete vacuum. The sulphur was heated to a temperature of about 175°. In this way all the sulphur chloride was removed. Using this purified sulphur, no visible combustion took place in the dry tube, although a small quantity of the oxygen was converted into SO_2. In the moist tube the sulphur as before burnt with a sudden explosion.

We now come to the combustion of phosphorus. Commercial stick phosphorus was melted under a solution of potassium bichromate in dilute sulphuric acid, dried and heated to 60° in a sealed tube with phosphorus trichloride to remove hydrogen.

This purified phosphorus was placed with some P_2O_5 in a tube of hard glass, bent at right angles and previously heated to redness. One end of this was connected by a piece of dry indiarubber to the stoppered neck of a gas pipette. The pipette contained oxygen which had been dried for eight days over P_2O_5. The tube was exhausted as completely as possible by a Sprengel, and the end connected with the pump sealed. The tubulure at the bottom of the pipette was connected with a flexible indiarubber tube, and this to a reservoir of dried mercury which could be raised or lowered at pleasure. After the whole apparatus had been left to stand in order to dry the air left in the vacuous tube, the following experiment was carried on:—The oxygen was admitted to the vacuous tube. On the pressure being diminished, a faint luminosity was seen on the surface of the phosphorus. The tap was then turned off and the tube allowed to dry for three more days. At the end of this time the luminosity had disappeared, nor did it again

show itself, though the pressure was varied in every possible way. The phosphorus was then melted, but still no luminosity appeared. It was then boiled, a faint glow appeared for an instant and then disappeared. The indiarubber tube in connection with the pipette was then clamped. The phosphorus tube thus closed was removed from the pipette. Air was squeezed out of the free half-inch of indiarubber tubing, and a little water allowed to enter. Brilliant luminosity at once flashed out and burst into a vivid white flame.

Ordinary phosphorus therefore does not burn in dry oxygen, though its temperature be raised to the boiling point.

Purified amorphous phosphorus was also heated in moist and dry oxygen, with the result that combustion did not go on in the dry tubes, though readily enough in the wet.

In one of the experiments a dry tube containing amorphous phosphorus was heated in boiling mercury, alongside a similar tube containing moist oxygen and phosphorus. The phosphorus in the moist tube ignited, that in the dry tube undergoing no change. But what is especially noticeable is that it underwent no allotropic modification, although kept in the bath for four hours.

Now it is stated that amorphous phosphorus is converted into the vitreous at a temperature which varies in different text-books from 260° to 300° C. Adopting this statement, it might seem that the dryness of the gas interfered with the change from one modification to another. To answer this question, two tubes containing phosphorus in dry and moist nitrogen were heated in boiling mercury for four hours. The phosphorus in both tubes was apparently unaltered. When the same tubes were heated in sulphur vapour at 440° the production of the vitreous modification was quickly noticed in both tubes. Dryness does not therefore apparently affect the change. From the above experiment it appears that the temperature usually accepted for the conversion of amorphous phosphorus into the vitreous is too low. It has been proved that the amorphous is not converted into the vitreous at the temperature of boiling mercury, that is 350° C., and that the change at the boiling point of sulphur 440° is very rapid. It might, however, be fairly argued that the change from amorphous to the vitreous takes place between the temperatures of 260° and 300° C. (those usually accepted in the text-books), and that there is another interval, during which the change does not take place, but that this interval ceases before 440°, the boiling point of sulphur. In order to test this, amorphous phosphorus was heated in nitrogen for several hours to 260°, 278° and 300°, but in no case did it undergo any change. We may then fairly say that the conversion of the amorphous into the vitreous takes place at a temperature higher than 300°, and, in fact, higher than 350° C. (boiling point of mercury). If moist oxygen were substituted in these experiments for nitrogen, complete combustion took place at 260°.

Now it is usually stated that amorphous phosphorus is incapable of true combustion, and that before it can be heated to its kindling point it is converted into the vitreous, which then burns.

It has, however, been proved above that amorphous phosphorus is not converted into the vitreous when heated in nitrogen to 260°, but that complete combustion takes place in oxygen at this temperature. It seems therefore probable that amorphous phosphorus does undergo combustion in oxygen without any previous change. This view is very much strengthened by the fact that amorphous phosphorus when heated for about twenty-five days undergoes a very slight combustion in oxygen at a temperature of 100° C., which is certainly much too low for previously converting it into the vitreous.

The general conclusions are then as follows :—

1. Pure charcoal heated in oxygen dried by P_2O_5 does not burn with a flame. Partial combustion however goes on, both CO and CO_2 being formed.

2. When charcoal burns in oxygen its combustion probably goes on in two stages. CO is first formed, and if circumstances be favourable, this is converted into CO_2.

3. Amorphous and ordinary phosphorus do not burn in dried oxygen. Ordinary phosphorus does not even show luminosity at any pressure in dried oxygen.

4. Amorphous phosphorus is not converted into the vitreous when heated in nitrogen to 300° C. This substance undergoes true combustion when heated in moist oxygen to 260° C. without any previous change to the vitreous variety.

The paper was followed by a discussion, in which the Chairman, Messrs. Browne, Bird, Fuge and Short took part.

Mr. F. C. J. Bird then gave a report on Pharmacy.

Report on Practical Pharmacy.

BY F. C. J. BIRD.

Suppositories.—To ensure success in the making of suppositories and bougies, the two chief points which require attention are the temperature of the mass at the time of moulding, and the thorough chilling of the mould. With respect to the former condition it is important that the cocoa butter be not allowed at any stage to pass beyond a creamy consistence, in order to prevent the subsidence of solid medicaments and the coherence of those of a resinoid nature. In hot weather the latter condition is not always easy of attainment, and as at certain times and places ice cannot be obtained a vexatious delay may be caused in the dispensing of the prescriptions.

Having been inconvenienced in this way on many occasions I have constructed a simple and inexpensive apparatus for rapidly cooling suppositories and bougies by means of a freezing mixture; and as it is independent of the use of ice and always ready for use at a moment's notice, it may possibly be of service to others who have experienced a similar difficulty. Freezing mixtures as a means of producing ice are of but limited application on account of the small effect produced; for although such a mixture may cause the thermometer to fall to many degrees below freezing point, the volume of water which can be converted into ice is comparatively trifling. For cooling suppositories, however, where a mere lowering of temperature is required, they are very well suited, and they possess the advantage of being always ready for immediate use.

The apparatus alluded to consists of a rectangular box of varnished tin, encased in flannel to the thickness of at least $\frac{3}{4}$ inch. A cover, with a similar thickness of flannel on the under side, fits on the box, and is furnished with a circular hole for a thermometer. A trough is held down in the centre of the box by two pins passing through wire eyes to prevent its floating in the solution, and contains a strip of stout tin plate bent so as to support the suppository mould, and by which the mould is lifted in and out of the trough.

When required for use the cover is removed and replaced by a piece of tin plate (which is so perforated that it acts as a sort of funnel for introducing the salt) and the box is charged with $2\frac{1}{2}$ lbs. of crystallized sulphocyanate of potassium or nitrate of ammonium. Upon this 38 fluid ounces of water is poured and the mixture stirred vigorously. The tin plate is then removed and the filled suppository mould placed upon the supporting strip and lowered into the trough, after which the flannel-lined lid is placed on the box. A thermometer inserted through the hole in the lid falls at once to 8° F. or 24° below freezing point if the water at starting be about 60° F., a common temperature in warm

weather, and a small bottle of water suspended in the liquid is quickly frozen. In one experiment I found that 1 lb. only of the sulphocyanate was capable of cooling twelve dozen suppositories before the thermometer had risen to 32° F. The liquid requires occasional stirring to maintain the effect.

When the apparatus is done with, lift out the inner trough, pour the solution into a shallow dish and set aside in a warm place to evaporate and crystallize. Collect the crystals by pouring the contents of the dish into a jar furnished with a muslin strainer, drain and preserve for another operation. To minimise the trouble of recovering the salt, it is better to take a fresh portion each time until a considerable quantity of solution has accumulated. This may then be evaporated down to about half its bulk and the crystals collected, the mother liquor being reserved for the next operation.

The inside dimensions of the box are 7½ inches long, 4 inches wide, and 5 inches deep; an apparatus of about one-fourth or one-sixth the capacity would probably answer for ordinary dispensing purposes. The convenience of having a practically costless means of obtaining at a moment's notice a cold of many degrees below freezing-point in an available form, will I think commend itself to all who have had much experience in the dispensing of suppositories.

Hollow Pessaries.—In the *Pharmaceutical Journal* for Jan. 19 last, an improved form of mould for making hollow pessaries was described by A. Wybrant, and the advantages of this form of pessary over the one generally in use fully discussed. It is not with this part of the subject, however, that I wish to deal, but with the production of the pessaries themselves, which may be made by much simpler means than those referred to in the above-mentioned paper. The defects of Mr. Wybrant's mould appear to me to be (1) that it is only adapted for making one pessary at a time, (2) that it would probably be expensive, and (3) that it is unnecessarily complicated. The arrangement I have here can be made by almost any one at the cost of a few pence, and moreover can be applied to any existing pessary mould which the pharmacist may have in his possession. It consists of a metal bar carrying six cores each of the size and shape of the desired hollow portion of the pessary. This fits on an ordinary pessary mould, and is kept in position by metal flanges at each end.

A few hints on making and fixing the cores may be useful. Procure a rather large suppository mould (30 grain size answers well), and in this cast a sufficient number of cones in block tin, and file off their ends perfectly level with the surface of the mould. Take a strip of brass one-eighth of an inch thick, as wide as the bases of the cones, and as long as the mould, accurately mark on it the distances of the centres of the hollows in the pessary mould, moisten with liq. zinci chlor., and with the blowpipe melt a drop of solder on each centre. Suitably support the strip of brass on the ring of a retort stand, and placing the tin cones so that their centres accurately coincide with the before-mentioned marks, heat with the blowpipe flame from below under each cone in succession until the solder meets and causes the cones to adhere to the bar. If the bar be now placed on the pessary mould the cones should fall exactly in the centre of the cavities, the metallic flanges at each end of the bar serving to keep it in position, and completing the arrangement.

The contraction which takes place when cocoa butter passes from the liquid to the solid state greatly facilitates the removal of the ordinary form of pessary from the mould, but it is evident that when dealing with hollow pessaries the contraction is in the wrong direction, and would cause the solidifying mass to close firmly on the central core and prevent their separation without the almost certain fracture of the pessary.

This difficulty can be overcome by the use of the following solution:—

Powdered curd soap	1 part.
Water	1 part.
Glycerine	9 parts.

Mix and heat until dissolved. Paint whilst hot on the cores. It sets at once to a soft jelly solid enough to resist admixture with the melted cocoa butter, and sufficiently soft to yield to the contraction of the mass and prevent its closing on to the core. Pour the melted mass down the spaces on one side of the bar; the air finds an exit on the other side; when cold remove the superfluous mass with a knife. The pessaries are perfect in form, and may be removed from the mould without the slightest difficulty.

Medicaments may be enclosed within these hollow pessaries, in which case the aperture is covered by a thin disc of cocoa butter. The mould for making these discs consists of a bar of brass one-eighth of an inch in thickness perforated with holes of the required diameter, and laid upon a similar but unperforated bar forming the base of the mould. To seal a pessary, invert it in the mouth of a phial, introduce the medicament, soften the cocoa butter by holding the flame of a spirit-lamp near, and place the disc in position.

I may state that the idea of making pessaries hollow with a view to convenience of application in obstetric practice was patented in this country in May, 1888; but as far as I can learn, no patent would be infringed by moulding them as described for the purpose of filling with a medicament.

Glycerine Suppositories.—Since the introduction of glycerine as a remedy for constipation, various formulæ have been proposed with the view of superseding the method of injection with its attendant inconveniences by exhibiting the glycerine in the solid state in the form of a suppository. These are dependent on the use of either soap or gelatine for solidifying the glycerine. The following is a formula recommended for those containing soap:—

Dialysed stearic soap dried and powdered	1 part.
Water	1 „

Rub together and add

Glycerine	9 parts.

Heat until dissolved, then evaporate until all the water is dissipated.

Stearic acid soap is the only kind which will answer, curd soap not forming a sufficiently hard mass. According to the above the suppositories contain 10 per cent. of soap, a proportion which gives them too high a melting point. I find that 5 per cent. of soap is quite sufficient to solidify the glycerine, and have, therefore, adopted the following formula, which gives a suppository melting about 98° F.

Powdered stearic soap	5 parts.
Glycerine	95 „

Mix thoroughly and heat till dissolved.

If exposed to the air these suppositories deliquesce. This is best prevented by dipping them as soon as made into collodium flexile, and thus treated they are quite permanent. Stearic acid soap may be made by the process given by Dieterich:—

Stearic acid, pure	4 ozs. 450 grs.

Melt and add gradually with constant stirring to

Crystallized carbonate of soda	2 ozs. 245 grs.

dissolved in—

Water	13¾ fl. oz.

heated in a water bath. When effervescence ceases, add—

Alcohol	3 fl. dr. 20 m.

cover the vessel and set aside for six hours. Add sufficient boiling water to just dissolve the soap, pour into a dialyser and float in distilled water kept hot. Change the water occasionally until no further impurities are

extracted. Evaporate the purified soap to dryness on a steam bath.

It may also be prepared by "salting out."

Take of—

Salt	1 oz. 63 grs.
Crystallized carbonate of soda	50 grs.
Water	3 fl. oz. 3 fl. drs.

Filter and add to the soap solution. Heat until completely separated, collect on fine muslin, drain and press. By this process the soap contains chlorides.

Glycerine suppositories prepared with gelatine:—

Gelatine	1 oz.

Soak in water for a few minutes, drain, allow to swell, and add—

Water	1 oz.

Dissolve in a water bath, and add—

Glycerine	9 ozs. by weight.

heat until the water is driven off.

If a 30 grain mould be used the "gelatine" suppositories contain 27 minims of glycerine, and those prepared with soap rather more than 30 minims. Contrasting the two formulæ, I prefer the one with the soap basis, as the soap suppositories appeared to be the more easily liquefied, and the glycerine in them is in a state of greater concentration.

Lately another formula has been published. It is as follows:—

Glycerine	4 fl. drs.
Soap	20 grs.
Ol. Theobromæ	100 grs.

I have not obtained good results with it. The ingredients have a tendency to separate, and require constant stirring during the moulding. The resulting suppositories are very soft, and are too large for the amount of glycerine they contain, one representing but 20 minims weighing 32 grains.

Various substances have been proposed as lubricants for suppository moulds, such as linimentum saponis, soft soap and glycerine, etc.; but for general purposes the first-named is most satisfactory. When used for some suppositories it frequently produces an unsightly efflorescent appearance on their surfaces; and this is especially noticeable on those containing dark coloured extracts as belladonna, hamamelis, etc.

In such cases a solution containing—

Castor oil	1 part	dissolved and filtered
Hard soap	2 parts	
Rectified spirit	18 parts	
Water	2 parts	

gives the best results.

When green extracts are prescribed in suppositories it is generally recommended that the extract be reduced with water to a creamy consistence. I have often noticed that suppositories made in this manner become covered with mould if kept for any length of time. A solution of—

S.V.R.	7½ parts.
Water	2½ ,,
Sapo mollis	1 ,,

used for softening the extract will prevent this, and as a further advantage the extract will be found to mix much more uniformly with the cocoa butter.

Chloral Hydrate Suppositories.—Chloral hydrate melted with oil of theobroma forms a liquid which will not set, and for this reason the usual method of forming chloral suppositories is to make a mass of the powdered substances in a mortar and press it into the mould. This is a tedious operation, in hot weather especially, and I consider that the process of melting gives more satisfactory results. The following is a method I have found to work very well. Place in a wide-mouth stoppered bottle—

White wax	1 drachm.

Melt in a water bath and add—

Powd. crystallized chloral hydrate	3 drachms.

Insert stopper, and when melted shake well and add—

Ol. theobromæ in shavings	1 drachm.

Shake until set.

Make the suppositories in the usual way, using 5 parts of the above mass for every 3 of chloral hydrate required.

Another formula is—

Stearic acid	equal parts.
Chloral Hydrate	

Melt together in a stoppered bottle until a clear liquid is formed; 2 parts = 1 of chloral.

The resulting suppositories melt at 95° to 98° up to the strength of 5 gr. of chloral in a suppository.

Some time ago I noticed a formula for chloral suppositories containing equal parts of chloral and wax with ol. theobromæ. On trial the melting point was found to be 120° F.

If from any cause a suppository mass is too soft it may be hardened by the addition of wax or spermaceti in the proportion respectively of $\frac{1}{14}$ or $\frac{1}{8}$ the weight of the ol. theobromæ. It is not advisable to add more than this, otherwise the melting point of the mass may be increased beyond the admissible limit of 98° F.

Hypodermic and other Alkaloidal Solutions.—It is well known that solutions of most alkaloids, especially if dilute, quickly undergo change, becoming turbid and developing a fungoid growth. This proneness to deterioration on keeping has brought about the introduction of hypodermic discs and tabloids, with the view of furnishing the physician with definite quantities of the various alkaloids in a convenient form, so that by dissolving them at the time of administration the patient may be secure from the evil effects arising from the use of a decomposed solution. In the extreme cases in which hypodermic injection is frequently resorted to, delay, however slight, may be most dangerous; and as a hypodermic disc or tabloid has to be dissolved before it can be used, the advantage of a ready made solution, if it could be kept free from change, is evident.

The sores which sometimes result from the puncture of the needle of the injecting syringe are said to be caused by the presence of micro-organisms in the injections employed, and inflammation of the mucous membrane has been produced by solutions of cocaine hydrochlorate containing fungoid growths. Solution of acetate of morphia, by long keeping, becomes of a deep brown colour, and it is remarkable that the sickness which was erroneously supposed to be due to the formation of apomorphia was always observed when old solutions were injected. May not this deep colour indicate the formation of some decomposition product of the alkaloid possessing properties different from those of morphine acetate? Solution of apomorphia develops a deep green colour on keeping, and cases have been reported in which alarming results have followed the injection of an old solution of apomorphia. It is, however, generally understood on medical authority that this discoloration does not sensibly interfere with the therapeutic effect of the alkaloid.

The germs of micro-organisms are introduced into liquids primarily from the atmosphere, and finding in an alkaloidal solution a suitable nutrient medium, develop and multiply at the expense of the alkaloid, and give rise to the turbidity and fungoid growths already alluded to. Three methods have been proposed to obviate this defect:—

1. The preparation of small quantities of solution at a time.

2. The use of antiseptics to destroy the germs or prevent their development.

3. The preparation of the solution with sterilized materials and its preservation in sterilized vessels.

Against method No. 1 may be urged the delay involved, and the inconvenience of so frequently preparing the solutions.

Method No. 2. The following substances have been

proposed from time to time as efficient preservatives for alkaloidal solutions.

	In the proportion of
Carbolic acid	·16 p.c., 1 p.c., 3·3 p. c.
Glycerine	20 p.c.
Carbolic acid and Glycerine	6·6 p.c. and 15 p.c.
Sulphurous acid	·6 p.c. to 1 p.c.
Chloroform	As chloroform water.
Camphor	·4 p.c.
Benzoic acid	1 to 2 grs. to the fl. oz.
Boracic acid	·5 p.c., 1 p.c., 1·1 p.c.
Salicylic acid	½ gr. to the fl. oz.
Thymol	·1 p.c.
Mercuric chloride	·005 p.c. for sol. cocaine.

It can hardly be said that any of the above substances are perfectly successful, and they certainly do not tend to improve the solutions in the direction of purity and neutral reaction. It is also well known that the addition of most minute quantities of a foreign substance to a medicament has sometimes a most powerful influence in modifying the therapeutic effect of that medicament. The compilers of the U.S. National Formulary probably had this in view when, in recommending the preservation of injections by chloroform water, they directed that it should not be done without the knowledge of the physician; and other authorities state that in order to permanently preserve hypodermic solutions by antiseptics, the latter must be used in proportions which are not admissible.

On the other hand, a writer in the *Therapeutic Gazette* advocates carbolic acid (3 per cent.) as a positive advantage, in that it diminishes pain and prevents the formation of abscesses. Dr. Squibb states that carbolic acid (⅙ of 1 per cent.) is unobjectionable in all known respects. A mixture of equal parts of glycerine and water is a good solvent for ergotin. The injection does not produce suppuration and keeps indefinitely. Sulphurous acid is useful in preserving solution of eserine sulphate, according to the excellent plan suggested by Mr. J. E. Saul. It is as follows:—Distilled water is boiled in a flask for a few minutes, the mouth of the flask is then closed with a plug of cotton-wool, and the whole allowed to cool. To this sterilized water sulphurous acid is added in the proportion of ½ minim to the fluid ounce, and the sulphate of eserine dissolved in it. This solution keeps white and clear, and some I made at least six months ago has not yet developed a trace of red colour. The proportion of sulphurous acid is so minute that it seems hardly possible that it can have any irritating effect,

Camphor water is adopted in the British Pharmacopœia as a solvent for hydrochlorate of apomorphine, but it seems to have very little preservative influence. Martindale in the 'Extra Pharmacopœia' recommends the addition of 2 minims of acid. hydrochlor. dil. to each 100 minims of the injection, stating that this keeps it stable and colourless, yet does not make it irritating when injected. I have found that although the hydrochloric acid prevents the development of the green colour, yet it diminishes the solubility of the apomorphine so much that it is only by slightly warming the liquid, with continuous shaking, that the alkaloidal salt can be got to dissolve, and on standing a portion invariably crystallizes out again. And furthermore, by keeping, the acidized injection assumes a deep purple colour instead of the usual green. The solubility of the apomorphine hydrochlor. is variously stated. Martindale says (third edition) 1 in 7, (fifth edition) 1 in 35, Squire, 1 in 70, and Dott gives it as 1 in 50. This latter figure agrees with my own experience. Considering that the coloration of apomorphine was probably due to the same cause as that of eserine, I tried the effect of making the injection with water prepared as mentioned above. The result was very satisfactory; the liquid remained almost colourless for several days, and then developed a very faint green colour which did not further deepen as long as the bottle was kept securely stoppered. For apomorphia the amount of sulphurous acid must be increased to 1 minim to the fluid ounce.

Chloroform water is as powerful as any of the agents enumerated in preventing or retarding the development of micro-organisms and fungoid growths; even moderately dilute solutions of such substances as citrate of iron and quinine, citric acid, etc., may be preserved in an unchanged condition by its aid. It does not seem, however, to be admissible in hypodermic injections, although better adapted for solutions of cocaine. Thymol forms an excellent preservative when used in the proportion of 1 in 1000. It keeps the solution clear and free from deposit, but in the case of atropine and eserine it has been stated to render the alkaloids inert after some months keeping. The same objection does not apply to camphor water, but of all the proposed preservatives I think this is the least efficient.

Salicylic and benzoic acids have been used as preservatives, but boracic acid, from its well-known and non-irritating and sedative action, is superior to any other antiseptic for this special purpose. Make a saturated solution in the purest distilled water attainable, boil for fifteen minutes, cool and filter carefully. Solutions of cocaine prepared with this keep well for any reasonable length of time, and there appears to be less objection to boracic acid than to any other of the substances which have been suggested.

Solutions of Cocaine.—A 1 in 2 solution of cocaine hydrochlorate remains clear and unchanged for any length of time, and for dispensing purposes it is a convenient plan to keep such a solution in a stoppered bottle, furnished with a pipette graduated in minims and an indiarubber teat. With this, any strength of solution can be quickly prepared by measuring in the pipette, and making up to the required volume with distilled water, thus saving an indefinite number of weighings and filtrations. Sol. cocaine (1 gr. in 2 m.); cocaine hydrochlorate 480 grains, boiled distilled water 5 fl. drs. Dissolve, filter, and wash the filter with distilled water to 2 fluid ounces.

Solutions of cocaine hydrochlorate are commonly spoken of as being of a certain percentage strength. This expression may be interpreted in several ways, and the term 20 per cent. solution, for instance, may be taken to mean 20 grains of the salt in (1) 100 grain measures, (2) 100 grains by weight, or (3) 100 minims of the liquid. Taking 1000 grains of cocaine hydrochlorate, and dissolving it to form a 20 per cent. solution according to the three methods, the following results are obtained:—

	Product in minims.	Cost per 5000 m.
From 1000 grains of salt	(1) 5494	(1) 39*s.* 6½*d.*
	(2) 5241	(2) 41*s.* 6*d.*
	(3) 5000	(3) 43*s.* 6*d.*

The strictly scientific way is doubtless to make the solution in percentage by weight, and it has been held to be illogical to speak of a percentage solution in which the stated proportion of one ingredient refers to weight and that of the other to volume. It is the custom in one well-known dispensing establishment to prepare per cent. solutions by grains in grain-measures, unless they are intended for hypodermic injection; in which case the grain-minim standard is adopted.

In another equally well known west end house solutions are always prepared so that the strength per cent. refers to grains in minims, this principle being also extended to fluid extracts. As the minim and fluid drachm are the units of volume in English pharmacy, and measures and hypodermic syringes are graduated in multiples of the minim, there is much to be said in favour of the last named system; and from

inquiries made of medical men I find that they always understand by a 1 per cent. solution a solution containing 1 grain in 100 minims. Again, when a medical man prescribes 1 minim of a 1 in 1 preparation, he intends to give 1 grain of the drug; in the generality of cases, however, the quantity actually given is but ·91 grain. Certainly, uniformity in this matter is most desirable.

Injection of Morphine.—The most convenient and reliable process for this important preparation is that recommended in the Extra Pharmacopœia. It consists in digesting a definite weight of morphine alkaloid with water and acetic acid at a gentle heat for 24 hours, sufficient acid being used to render the liquid, at the end of that time, barely bright. The liquid is filtered, and the filter washed to make the required volume of product. One per cent. of glycerine may be added to prevent incrustation. Prepared in this way with well boiled distilled water, and stored in small bottles filled to the neck, and excluded from light, the injection may be preserved of a pale straw colour for a long time. In the days of the 1867 Pharmacopœia an excellent preparation could be made with the tartrate of morphine, the injection keeping light in colour, free from deposit, and neutral; but unfortunately this salt is not sufficiently soluble to form a stable solution of the present strength.

Sterilization.—The last and best method of improving the keeping qualities of hypodermic solution is that of "sterilization." This depends for its success on the destruction of the germs of microbes in the solutions and vessels by the agency of heat, and has the manifest advantage of adding no foreign substance to the injection and of tending in the direction of absolute purity. The following is a mode of operating lately recommended:—Sterilize the flasks, vessels, etc., by first washing them out with distilled water, then with a 1 in 1000 solution of corrosive sublimate, and again with sterilized water. Heat in an air-bath to 250° F. for half an hour, plug the mouths of the vessels with cotton-wool, and allow to cool. Draw over the distilled water used in glass, and reject all fractions which give a coloration with Nessler's reagent. Collect the distillate in a sterilized flask, dissolve the medicament, boil fifteen minutes, and make up to the required weight with sterilized water. Store and dispense the solution in sterilized vessels. The weak point in the foregoing process appears to be the boiling of the alkaloid for fifteen minutes. It surely cannot be desirable to subject a substance like apomorphia hydrochlorate to a quarter of an hour's hard boiling. Might it not be possible to accomplish the sterilization of the medicament in a less objectionable manner, such as by exposure to a germicidal vapour? If it were more generally the practice when making solutions of alkaloidal salts to use distilled water specially distilled and sterilized, there would be less ground for the statement so frequently made, that in solutions of alkaloids, whether prepared with antiseptics or not, most of the active principles quickly undergo change, and that for this reason ready-made solutions are dangerous and unreliable.

There is need for much further information on this important subject. As will be seen from the table already given, opinions as to the quantity required and preservative power of the different antiseptics do not agree, nor can there be said to be any *exact* knowledge as to the influence therapeutically of antiseptics in hypodermic solutions. Could it be shown that any one antiseptic is without influence in modifying the action of the medicament injected or applied, it seems probable that future progress would lie in the direction of a combination of the two methods of sterilization and antiseptics, and that a permanent preparation might be looked for in the form of a germ-free solution protected from further infection by a suitable antiseptic.

The report was illustrated by apparatus and specimens, and gave rise to a discussion in which the Chairman, Messrs. Thornley, Fuge, Browne and Short joined.

The meeting then adjourned.

Provincial Transactions.

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

A meeting of this Society was held at the Maypole Hotel, on Wednesday evening, May 8. Mr. W. H. Parker, Vice-President, in the chair.

Amongst those present were Messrs. Dennis, T. B. Fletcher, C. Fletcher, Middleton, Wildgoose, Wilford, W. Widdowson (Hon. Sec.), etc.

The Chairman said the meeting had been called specially to discuss the proposed alterations in the classification and charges for conveyance of goods sought by the various railway companies under the New Railway and Canal Traffic Act. He contended that if this Act should become law, and the companies were given these extraordinary powers, they, as chemists, would suffer almost more than any other trade, because the proposed classification, etc., affected their goods more in particular, and especially the rating of small packages and empties.

Several others present also spoke strongly against the injustice that would ensue in the passing of the Bill as it now stands.

A resolution was proposed by Mr. A. Middleton, seconded by Mr. C. Fletcher, and carried unanimously:—"That this meeting protests against the increased maximum rates which various railway companies are seeking to impose under the 'Railway and Canal Traffic Act, 1888,' also to the unfair classification proposed for 'drugs and chemicals packed in hampers,' and also for 'empty packages,' which are to be placed in Class V. As claims from chemists for breakage are so small in comparison with these proposed charges, they consider that this, coupled with the enormously advanced extra rate for small packages, will be a great injustice in the carrying on of their trade. This meeting also desires to accord its fullest approval of the action taken by the Chemical Section of the London Chamber of Commerce in bringing the above and other grievances so ably before the Government Board of Trade."

It was also resolved that the Secretary should send a copy of this resolution to Mr. Francis, London.

A cordial vote of thanks to the Chairman for his services concluded the meeting.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The first of the botanical excursions arranged for the summer months took place on Wednesday morning, the 15th inst. There had been a very heavy rainfall during the previous night and the sky was still overcast and threatening. Nevertheless a goodly company assembled at the Royal Botanic Gardens, Inverleith Row, at 6 a.m.

The place formerly occupied by the beds of medicinal plants has now been entirely altered, and the space laid out with a very complete representation of all the natural orders. These are arranged systematically and very compactly, there being no duplicate specimens, and this promises to be a most valuable collection for botanical students. As yet, however, it was found that the number of specimens in a condition for examination is comparatively small.

Despite the somewhat unfavourable conditions, about two hours were spent in a most pleasant and profitable examination of the many interesting speci-

mens to be met with, and it was felt by all that the time was only too short. The most interesting specimen seen was a fine flowering plant of *Megacarpæa bifida* from Saharunpore, India, which formed a conspicuous feature of the flora of the Rock Garden, and was in fine condition for examination. At first sight the plant might readily be mistaken for one of the *Umbelliferæ*, but a closer examination shows that the fruit is a silicula, and that it belongs to the *Cruciferæ*, in spite of the very irregular character of the staminal whorl, which contains from eight to sixteen stamens. The next excursion is an evening one to Colinton Dell on the 29th inst., by Caledonian train at 8.40.

LIVERPOOL PHARMACEUTICAL STUDENTS' SOCIETY.

The last meeting of the session was held on Thursday evening, May 9, the President, Mr. H. B. Thornton, F.C.S., in the chair.

A paper was read by Mr. Harold Wyatt, Junr., on "The Sources of Caffeine," before a large audience.

Specimens of caffeine, guaranine and guarana were kindly lent by Messrs. Evans, Sons and Co.; a kola plant, kola nuts, preserved and dried, by Messrs. Christy and Co.; fresh cocoa fruit, cocoa seeds from various plantations, and cocoa butter, by Messrs. J. S. Fry and Sons, Bristol, who also sent a coloured drawing of the cocoa plant.

The Society has not been long in existence, but has over fifty members, and has a good balance to carry over to next session. Botanical excursions have been arranged at intervals during the summer months with a view of keeping members together.

Obituary.

Notice has been received of the death of the following:—

On the 5th of May, Mr. John Shone, Chemist and Druggist, Whitchurch, Salop. Aged 41 years. Mr. Stone was an Associate of the Pharmaceutical Society.

On the 10th of May, Mr. William Jervis, Chemist and Druggist, Broomhill, Sheffield. Aged 45 years. Mr. Jervis had been a Member of the Pharmaceutical Society since 1872. He was also for several years a member of the executive of the late Trade Association.

On the 10th of May, Mr. David Leslie Johnston, Chemist and Druggist, Woodlands Road, Glasgow. Aged 26 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Council Election.

Sir,—At the bidding of an alien and irresponsible association the members of the Pharmaceutical Society have run the risk of losing their President, who was re-elected last week by a bare majority of 59 votes. It is superfluous to say that the President's services during the past seven years have been almost unprecedented. Probably Mr. Sandford's services in the same capacity have alone equalled them, and Mr. Sandford received still worse treatment, escaping rejection by the still narrower margin of three votes. Upon that occasion the malcontents congratulated themselves that they had lost nothing but honour. They know now that the Society lost an opportunity which will never return, and that it lost prestige and influence which it will never regain. But they had at least this excuse, they acted upon their convictions, and they knew what they voted for and what they voted against. Evidently they did not know this last week. They put their consciences in the hands of those who were totally ignorant of the Society's affairs, and who proved their ignorance by recommending for re-election the most active members of the Research Laboratory Committee, and by recommending the exclusion of Mr. Butt, who has taken up a mistrustful attitude towards the research movement, giving as their reason that this was a means of discountenancing cruelties assumed to be intended to be practised in the prosecution of pharmaceutical research!

But have either the advisers or the advised taken a single step to inform themselves whether experiments of any kind are performed or contemplated upon animals in the Research Laboratory? As a matter of fact they are not; and they are obviously outside the scope of pharmaceutical research, being a department of physiological investigation upon which pharmacy has no title to intrude.

It is time the members of the Pharmaceutical Society, which claims to be a self-governing body, should use their own discretion in the management of its affairs. Crotchet-mongers are becoming an insufferable nuisance. They concentrate themselves so exclusively upon their one peculiar object as to lose all sense of proportion, as one who gazes too steadfastly upon the sun, sees suns wherever he turns his looks, and sees nothing else. It is rather too much when these purblind enthusiasts ask us to take their distorted visions for sober facts. "What! because they are virtuous shall there be no more cakes and ale?"

The Society has narrowly escaped a serious calamity, and the members who have brought about the risk owe the President a humble apology. I hope the two dozen or so impulsive pharmacists, who incautiously permitted themselves to be made decoys by the anti-vivisectionists, will join in thankfulness at the failure of their indiscreet association with strangers in a matter affecting the internal affairs of the Society. They will probably on reflection see that such proceedings are not exactly loyal to the body to which they belong. I also venture to anticipate that when the President next seeks the suffrages of his brother pharmacists he will receive the support due to his eminent services in the shape of a more unanimous vote than has ever been cast, and I hope he will magnanimously accept it as our apology for the recent unmerited affront.

R. W. Giles.

Antagonism in Pharmacy.

Sir,—There seems after all to be something in Grove's "Law of Antagonism." Would the pharmacist have been better off to-day had the original Pharmacy Bill of 1865 been passed? I don't believe he would. A monopoly would thus have been created, and no monopoly would be allowed to stand at the present day. When you come to this point it is not difficult to see that the fact of a monopoly existing would have brought many more into the business, and the result would have been much worse to-day. The President, for once in his life at all events, practically admitted at the annual meeting what he really felt when he treated the subject of "stores."

It is a fact which is kept underground by masters, that, as the "Lords" contend, assistants have been greatly benefited by the existing interpretation of the Act. It has increased the demand for qualified assistants, it has given them a decent salary, it has given them a better and altogether different position (including shorter hours, etc.), and lastly, but by no means least, it has placed the pharmacist on a more professional basis in the public eye than the Pharmaceutical Society or almost all other agencies put together; aye, and more than that, it has brought the Pharmaceutical Society itself more prominently into contact with the public, who consequently are getting to understand the previously mystic letters, A. P. S.

The public are just as well served,—and in many cases even better,—when any business is in charge of a qualified assistant, as when a master goes off for a month and leaves a junior in charge, or as is frequently the case opens a branch shop and puts anyone into it he pleases, very often a newly finished apprentice. This is the very type of man who runs down stores, applies all the clap-trap which his ignorance forces him

to swallow concerning the Pharmaceutical Society for not protecting his monopoly, for allowing stores to come into existence, for not smiting the Inland Revenue authorities, for not adopting half sifted notions, and not drafting "Bills" in harmony with the feelings of his equally ignorant brethren, and so brings ridicule and discredit on the whole body. Question that man, and you will generally find that he knows nothing of the history of the Pharmaceutical Society, and of the Pharmacy Act only what he has learned by hearsay, and perhaps does not even understand what that means.

What is the difference between a pharmacist engaged by a "Limited Drug Company" and a chemist engaged by a "Limited Chemical Company?" The answer is self-evident. If you look upon the scientific chemist as a professional man, what must you consider his analogue, the scientific pharmacist, to be?

I admit these are hard nuts to crack, but without bias can you deny them?

This just brings me to a point which seemed to puzzle some of the members, that in the face of all this competition more candidates had presented themselves for examination; and not even the President himself ventured to assign a reason. Now with due deference to all I think the reason is plain enough. The Education Bill and its requirements are known to all grades of the craft; those threatened to be affected are keen to escape it and so both young and old men push forward to the Preliminary, the latter probably having failed to do so at the proper time. Again, qualified men are more in demand than ever. And why? Because master chemists see very well that if they don't keep qualified assistants (and medical men are not slow to recognize it) the stores will very soon be the recognized bodies. And so the world moves after all, and antagonism undulates throughout.

One member broaches the question of the lapse of members, and the President thinks the guinea has something to do with it. Well, I have no doubt it has something, but I think the great evil is an unsound education to start with, and consequent aberration of the reasoning faculties. Take the average man in that position, and what do you generally find? You find that he was engaged as an errand boy and not as an apprentice; that he was lured into a chemist's shop by the public gossip concerning huge profits, without any inclination whatever towards the business; that he was never made aware of the existence of a Pharmaceutical Society, nor of any examinations; that he received a meagre education; that he got through that crucial examination, the Preliminary, perhaps at the second, third or fourth trial. Then after twelve months' "coaching" he scrambled through the Minor "with a squeeze," and maybe at the third or fourth trial, or perchance he may have been registered as being in business previous to the Act, and he soon finds out that the profit gossip is all bosh. He then sees nothing for it but to join in the chorus, "O ye hypocritical Society, why have ye thus led us into a wilderness instead of a land flowing with milk and honey?" In connection with this point I must tackle the Council. Why allow such a Preliminary examination to exist in the face of a universal higher education? Why begin at the end in your reform by establishing a Research Laboratory? Who are going to be the workers? Men without any knowledge of mathematics or mechanics, or in other words without an educated reasoning power (at least so far as your requirements are concerned)? No. Specialists and honorary members have to take the place of the pharmaceutical chemist, and here again the "antagonistic ether" once more vibrates before the eyes when we recall the anti-vivisectionists. One would almost imagine, judging from their remarks on education, that there are even some members of Council who could come under the above diagnosis. The germ of protection still finds sustenance in the minds of some of its members, notwithstanding the glaring tendencies of all grades of Government and the demands of the public. Name a trade or profession at present enjoying the shadow of a monopoly or protection built on legislation, and where it may seem to exist in words it is not allowed to be practised. Take the medical profession, for example, and what do you find, even with all their expensive curriculum? You have bone-setters, chemists prescribing, etc., etc., and what can they do? Prevent you from using their titles. What is the reason they are not affected with "stores?" but simply this, that their whole work depends on the exercise of their individual brain power, and the public can see that, and can judge from results. In the case of the chemist this is much more obscure, and consequently the public look upon him as a mere hand to mouth worker, whose work may as well be conducted by a grocer or huckster. By the establishment of a curriculum the public would then be able to recognize that if a scientific education was necessary the results of that education must vibrate throughout the work of the chemist for the successful accomplishment of his calling, and this would tend much to raise his status in the public eye. I think no one will be bold enough to assert that that fact alone would not be attended with beneficial results. "Man, protect thyself," should be the motto of the protection yearning chemist.

The President was well complimented, and he deserved it, for he did wax eloquent, and under the fire of his eloquence the arguments of his antagonists withered like grass in an oven. In fact, it reminds one of Mark Anthony's sympathetic but subtle oration over the body of Cæsar, which turned the tables against Brutus, and the acknowledgments finally showered upon him vividly recall another part of Shakespeare's Cæsar, where Cassius vaunts, but ultimately submits to the chiding which Brutus is pleased to bestow on him.

But there is one point to which I must refer. Is professionalism necessarily antagonistic to or destructive of trade? I think not. Does not all professionalism contain its trade element, and does not all trade contain its professional element? Do not the two harmonize and work together for a common end, and that is for individual gain? The difference is one of degree, and not of kind, and in fact they are closer knit together at the present day than ever. If you call pharmacy a trade, must you throw over education altogether, as is assumed? If I were to answer the question, I think I should be discrediting common sense. Indeed, pharmacy properly so called is certainly a profession. It is when you come to vending that the trade element appears, and the two combined constitute the business of the pharmacist.

Grove's conclusion (if I remember rightly) took this form:—"I humbly beg to doubt the mortality of the universe." Well, I cannot bring myself to that conclusion, because to do so I must rid my mind of a governing intelligent Being, which I cannot; but I shall try and console the "poor chemist and druggist" by assuring him that so long as natural law acts in this material universe there is one thing certain, that if he chooses to use the powers that be, he will obtain a livelihood, and I would counsel him in those noble words, "Whatever thy hand findeth to do, do it with all thy might."

"The darker the clouds, the more dreary the night,
By going wrong all things come right."

Edinburgh. T. Retson Carswell.

Beating the Dog.

Sir,—The account of the Annual General Meeting of the Pharmaceutical Society is interesting reading, but it would have been more edifying had not some of the speakers been such evident believers in the doctrine that "any stick is good enough to beat a dog with."

Mr. Bland, for instance, strangely contradicts himself in his haste to heap ridicule on the Council of the Society, for he says, "There is a general impression amongst people that there is a tendency in the Council to press the matter of education too far. We do not want to manufacture razors to chop firewood." If this passage means anything, it means that the curriculum will provide a chemist with much too good an education for the duties he will be called upon to fulfil.

But immediately afterwards, Mr. Bland negatives this statement by saying that "whatever teaching he (*i.e.*, a student) may get under the curriculum will be necessarily of a superficial and imperfect character." We thus have this gentleman in one sentence deploring the excess of education contemplated, and in the next remark regretting that the proposed change will not go far enough. Surely it is not possible to attach "importance" to statements so conflicting. But assuming for the nonce the latter remark to be true, is there, I should like to know, any valid objection to a young man commencing the study of certain

sciences simply because he can never hope to fully comprehend them?

Was Mr. Bland himself content to remain in his pristine ignorance because he could not obtain the complete mastery of chemistry, botany or pharmacy? Or is it that his title to rank among the "greatest men of the day" is so clear that it removes him from the category of those who are foolish enough to begin a study they can never complete? I trow, neither, for did he belong to the latter class he most certainly would not scorn the first steps in the ladder of knowledge.

If this gentleman's doctrine is to hold good, then all study and all examinations are valueless so far as the great majority of students are concerned, for few indeed can attain to the heights reached by the "greatest men of the day."

52, *Harrow Road, W.* ALBERT H. WILKERSON.

THE SALE OF PATENT MEDICINES.

Sir,—The proceedings at the Annual Meeting of the Pharmaceutical Society were read with considerable interest by myself, and I daresay by many hundreds besides; and I for one could not but admire the gentle, straightforward manner with which the President (Mr. M. Carteighe) replied to all parties.

I shall not attempt to criticise the whole proceedings, for that is more than I dare attempt: but I must say I was always under the impression that the Society was formed to protect the interests of the trade. It appears it is protecting the trade in a legitimate manner, but not to cheat the Inland Revenue Authorities, which I think I am right in saying many would like to do, until they are found out, when they cry out at what they call the injustice done them by the Inland Revenue Authorities, who, they say, know nothing of the Medicine Stamp Act. But as Mr. Carteighe said, "What is the use of a single chemist opposing their decision?" It is much better to be quiet, and especially when you know, almost to a certainty, that your preparation is liable to patent medicine stamp duty, pay the mitigated penalty of £1 rather than defy their decision, and be compelled to pay the full penalty of £10.

I grant that many times their decisions on the liability or non-liability of labels to stamp duty appear inconsistent, and I have known one or two instances lately, where they have confessed their error and allowed the preparations to be sold as heretofore. Nevertheless, where they are once wrong they are ten times right.

Respecting the retailing of patent medicines by hucksters, stores, etc., it appears from the President's statements that chemists have no right whatever to complain of their conduct, the trading in such articles belonging to another class entirely distinct from ourselves, and, to use Mr. Carteighe's own words, "We have stolen the booksellers' clothes."

Chemists are never content—very few people are now-a-days. Still, I think we were considerably better off when the patent medicine licence was two guineas; for then we had no "cutting." Almost any shopkeeper, however small, can afford 5*s.* annually; and as almost all patent medicines bear the price in plain figures, the reductions made on them by the retailers simply act as bait to draw the public, and I think I will not be disputed when I say the chemist is now doing his share to catch them in his net with the same tactics.

Heaton. D. H. OXEN.

Sir,—Having read the report of the Annual Meeting at Bloomsbury Square, I note first it is acknowledged the members of the trade do not show the interest in the Society that could be wished, and second that this is attributed to want of knowledge of the work done by the Council, and that could this ignorance be removed, it is thought the Society would receive a large accession of strength both in numbers and moral force.

It may be gathered from the President's speeches, that not all the work of the Council is reported in the Journal; take for instance the Medicine Stamp duty. That is I think often supposed to be one of the subjects neglected by the Council, to the detriment of the trade, and yet it is evident that it must have been carefully considered. At any rate Mr. Carteighe has a very clear perception of the matter, both from the Somerset House and the trade points of view.

In the reports of the Council meetings, we frequently see reference made to a previous discussion in Committee, but what the reference of the subject may be, or how it has influenced the subsequent vote, the body of the members are uninformed.

I think there is small wonder that the members of the Society and the trade are dissatisfied with and show want of interest in the Society, while they are ignorant not only of the difficulties under which the work of the Council is carried on, but also to a great extent of what that work actually is. I would suggest this dissatisfaction with the Society might in a great measure be obviated could it be found possible to impart information in greater detail of the work done at Bloomsbury Square, either by reporting discussions in Committee or otherwise, so that the body of the Society might have a clearer idea of the work done by its head. Could something of the kind be done "What is the use of the Pharmaceutical Society?" would perhaps be a less frequent query.

Bournemouth. S. HARDWICK.

Sir,—In the trade journals of last week the President is reported to have said, "The people who put up medicines for the other traders were very well known; there was a firm in the north of London, he need not name them; these people took care to protect their customers by stamping medicines whenever it was necessary to do so." This of course refers to my firm, Lorimer and Co., it being the only one in north London which supplies other traders.

But this statement, made in a company of pharmacists, and published in a trade journal, is utterly misleading, and I therefore beg leave to qualify it by adding that while we are "the people," etc., we are also qualified and manufacturing chemists, by far the most important part of our customers at home and abroad being also chemists and wholesale druggists. These customers are well informed as to the nature of our business with "other traders," for they always receive our English lists; but chemists who are not our customers could only infer to our prejudice, from the President's remarks, that we supply "other traders" only. Why does the President single out my firm? Could he be ignorant of the fact that among the auditors and council of the Society there are at least four gentlemen, members of wholesale firms, two of which firms created the trade referred to long before Lorimer and Co. existed, and all four push it in the most vigorous manner now? Two of them publish English "per doz." lists to be found in shops of grocers, drapers, etc., and I am at a loss therefore to understand why, with these gentlemen sitting around him, it should be necessary to wander to "the people" in north London. The fact is, but few houses confine their business to retail chemists only, and I should feel interested in seeing the balance sheets of those few. I am of course aware that certain firms do this business *sub rosa*. I recently called on a large wholesale house, and was politely informed that my firm, in company with certain others, was to be "boycotted;" but judge my surprise on offering "Chemical Food" the same day to another trader on being told that he bought it from the firm which had just threatened to boycott mine. I was shown the invoice and bottles supplied, the striking feature about them being that the means of identifying the suppliers was carefully avoided, so that in the process of boycotting these bottles would no doubt be displayed to the gaze of many an indignant chemist as examples of the style of business carried on by "the people in the north of London." There is another firm most ably represented in the Society which is very active in this trade. They do not publish a price list in English; their travellers carry and sell from the one published by my firm. They send out hampers with plain tallies, and bottles with plain labels, and thus, like others, have two strings to their bow. They supply the grocer or store; their traveller calls on the chemist next-door, gains his sympathy by blackguarding the firm (supposed to be Lorimer and Co.) which supplies the grocer next door, and having gained his sympathy, has little difficulty in filling his order-book at good prices, so that what with the attentions of such gentlemen and that of the President, my firm is receiving an advertisement which really belongs to others,

and which I beg to decline. On a recent occasion a gentleman on a visit to Edinburgh was trotted round by a brother pharmacist of that city and shown "Parrish's Gold Medal Chemical Food" in nearly all "other traders'" windows, but my firm had not supplied, and does not now supply, any one of these traders direct. My preparation was displayed in many cases alongside of Dinneford's Magnesia, and in these and similar cases the people who put it up should, by the same rule, be publicly commended by the President. But while the best part of my firm's business is with chemists, it is also quite true that "we take care to protect our customers' interests by stamping medicines, whenever it is necessary to do so," and I think that the President, having said this, might have gone a little further and said that the best solution of the Stamp Act difficulty is for every chemist to sell only those specialities put up by "the people who take care to protect their customers." They would thus experience none of the troubles which beset them, and would moreover get better advertisement, more profit and larger returns. But as all chemists may not yet be educated up to this point, I suggest that they cannot do better meanwhile than follow the excellent advice given by the President.

J. Lorimer (Lorimer and Co.).

Suggestion as to a Diploma.

Sir,—I quite agree with "A. P. S." in letter in Journal of May 11, *re* Diploma for Associates, and I think it is one very much to the point, and should not be lost sight of, and I am quite certain it would be a means of attracting more associates to the Society, also of more closely binding the present ones. The diploma might be similar to the one given to chemist and druggist members of the Pharmaceutical Society. I am sure most of the present associates would not object to pay a small amount for initial cost of such diploma, and I hope the new Council will take the matter up, as I am sure it would not be a costly manner of strengthening the Society.

Fred. G. Walton.

Sir,—"A. P. S." (Norwich) to my mind has hit one of the right nails on the head, and I hope to see it driven home to the building up and augmentation of our Society. A great deal of the apathy, I believe, in subscribing to the Society by a vast number of Minor men is due to the fact that after paying their subscription they only have a receipt on a slip of paper, and are only enabled to take the title A.P.S.

Now many men have said to me, "If I cannot be an M.P. S. I will be nothing at all." I would suggest that our present associates in business be raised to the degree M.P.S., and our worthy superiors to F(ellow) P. S., granting each diplomas, as other professional bodies treat their members and fellows. A.P.S. might be advantageously retained for our present associates *not* in business. Then might our Society grow and flourish as a green bay tree.

John W. T. Morrison.

Methyl-Orange and Other Indicators.

Sir,—As Mr. Allen's article on "Methyl-orange and other Indicators" seems to have been suggested by my little note on methyl-orange, perhaps I may be allowed a few remarks on his communication. In the first place, permit me to say that no one would think of commending litmus on account of its delicacy. Every one knows that methyl-orange and phenol-phthalein are superior in that respect and that they may be used in cases where litmus fails. On the other hand, litmus is a very stable and reliable substance, less likely to be affected by the presence of unknown foreign compounds than the more sensitive indicators, and less likely to give inaccurate results from having been improperly prepared. Litmus is also the best indicator in the titration of alkaloids. As regards the literature of the subject, before writing my note, I read all I could find on the subject in the ordinary books of reference and in the Journals, including the well-known paper of Mr. Thomson, which has already appeared in at least two journals. In none of these did I find any information on the point in question. However, since my note was published in the *Pharmaceutical Journal* a very interesting paper has been kindly sent me by Mr. B. Fischer, of Berlin, the paper being the joint work of himself and Mr. O. Philipp. The communication was published in the *Archiv der Pharmacie* (23 Bd. Hft. 10), and is entitled "Dimethylamidoazobenzol als Indicator für Alkalimetrie." After remarking on the fact that litmus still holds its own, and has not by any means been replaced by methyl-orange, notwithstanding the superior properties of the latter, they proceed to explain that the reason of this is to be found in the fact, that under the name of "methyl-orange," products of dissimilar constitution are to be met with in the market. It is difficult to determine the purity of these, and, as Messrs. Fischer and Philipp have repeatedly found, in many cases the passage from orange to pink is not at all well defined. These difficulties vanish if instead of methyl-orange (dimethylamidioazobenzol sulphate) the free base be employed. When this is used as indicator in alkalimetry the end reaction is very sharp, and trustworthy results are obtained. A detailed method is given for preparing the pure dimethylamidoazobenzol, and tables are appended showing the accurate results obtained in titrating potassium and sodium carbonates, and ammonia. This indicator may especially interest Mr. Allen, as it forms an exception to his list of acids and salts. It will be seen from the above paper that my experience of defective methyl-orange is not solitary.

Edinburgh. D. B. Dott.

Casein as an Emulsifier.

Sir,—I have just read in the *Pharmaceutical Journal* of the 23rd of March, p. 777, a note by Mr. Peter Boa, entitled "Casein as an Emulsifying Agent." After having quoted my memoir upon the same subject the author says that it is his intention rather to occupy himself with the preparation of pure casein than in constructing a formula for its employment. As a conclusion the author states that casein produces emulsions that look well when just shaken, but which separates in a short time.

This conclusion is justified completely if use is made of casein prepared according to the old methods. But the principal interest in my work consisted in the preparation of an inalterable product (saccharure de casein), yielding emulsions that are always very stable, provided that the process indicated by me is followed exactly. If Mr. Boa would like to make the experiment, I beg that he would kindly address himself on my authority to Mr. Port, pharmacien, 28, Rue du faubourg du Temple, Paris, who manufactures the "saccharure de casein," and will send him gratuitously a sample of the product.

Paris. E. Léger.
Pharmacien to the Hôpital Beaujon.

Re Arsenical Glycerine.

Sir,—I gather from a note in "The Month" of April 27, that a large proportion of the glycerine manufactured in Germany contains arsenic. I wish to point out that it is not only glycerine of German manufacture which contains this impurity, as I found some twelve months ago that several commercial samples, including one from a well known English maker, contained arsenic in notable quantity.

Birmingham. R. A. Cripps.

Interference of the Society for the Protection of Animals from Vivisection with the Council Election.—B. Bryan.—We find nothing in your letter to alter in any degree the opinion we have already expressed on this subject.

Elector.—We do not think it desirable to publish anonymous communications upon a subject so important as that dealt with in your letter.

Ph. Chemist G. B.—If you refer to the *Pharmaceutical Journal* for May 19, 1888, p. 968, col. ii., you will see that it is not necessary to make the suggested correction.

T. J.—(1) *Symphytum* species: the species cannot be identified in absence of leaves, and with undeveloped flowers. (2) *Lamium purpureum.*

Honig.—Daphne pontica: not a British species.

F. Thornton.—We do not find your name in the list of persons receiving the Journal from the Society.

Communications, Letters, etc., have been received from Messrs. Maxwell, Parsons, Ogle, Chapman, Maben, C. H. F., Another A. P. S.

STARCH IN ENEMATA AND SUPPOSITORIA.

BY JOSEPH INCE.

The Enemata of the British Pharmacopœia, five in number, are generally regarded as useful extemporaneous formulæ inserted for convenient reference. We are bound, however, to present any preparation recognized by authority, in the best possible manner.

With one exception, the enema asafœtidæ, made with distilled water, they may be described as medicated compounds of the mucilage of starch.

We have three varieties of amylum at our command: that procured from the grains of common wheat, *Triticum sativum*; maize, *Zea Mays*; and rice, *Oryza sativa*.

In preparing the official mucilago amyli the choice is left free.

The selection is not a matter of indifference in a dispensing point of view.

The use of rice starch in preparing the mucilage ordered in enemata is not to be recommended, as the result, even with skilful manipulation, is poor.

Wheat, or maize starch, may be advised, preferably the former, as being the more readily procured.

From both an excellent agent of suspension may be produced, by means of which these otherwise unsightly remedies may be presented in a perfect state of combination.

The enemata opii and terebinthinæ may be dismissed without comment.

The enema aloes is constructed on a strictly scientific basis; the carbonate of potassium which it contains materially assists in effecting the solution of the aloes. The same alkali is employed with equal advantage in the decoctum aloes compositum.

The enema magnesii sulphatis presents a dispensing difficulty, the official formula and directions being as follows:—

Sulphate of magnesium . .	1 ounce.
Olive oil	1 fluid ounce.
Mucilage of starch	15 fluid ounces.

Dissolve the sulphate of magnesium in the mucilage of starch, add the oil and mix.

Should these instructions be literally carried out the result is unsatisfactory. Oil of any kind so added to a solution of a salt must separate, and the present instance forms no exception to the rule.

The method to be employed is simple and depends on a well-known dispensing arrangement. Reserve half the quantity of water and in it dissolve the sulphate of magnesium. Next, make a starch mucilage with the remaining half of the water, and incorporate the olive oil with the concentrated mucilage. Finally, add by degrees the dilute solution of the magnesium salt. Two objects are thus secured—a perfect medicinal compound and an excellent emulsion.

The Suppositoria of the British Pharmacopœia are divided into two classes: those with oil of theobroma as a base, and those with curd soap. The former are melted and poured into a mould; the latter are best made by hand.

The glycerinum amyli ordered in the enemata cum sapone may be readily prepared from either wheat or rice starch.

When these soap compounds are extemporaneously dispensed and are intended for immediate use the starch glycerine appears to be in excess, and taking the quantities specified in the official formula, one scruple must be substituted for half a drachm. The excess is apparent only, for on keeping, the suppositories stiffen into a mass, the consistence of which leaves nothing to be desired.

The quantity of "starch in powder" is left to the discretion of the pharmacist, but that prepared from rice is strongly to be recommended.

Its firm granular texture renders its use specially advantageous in obtaining the required suitable consistence.

NOTE ON A NEW ADULTERANT OF PULVIS ACACIÆ.

BY JOHN HENRY WILSON,

Pharmaceutical Chemist.

In making cod liver oil emulsion with powdered gum I noticed in an otherwise excellent emulsion that it appeared to be whiter than usual, and on diluting it with water, and allowing it to stand for a short time, a small quantity of white sediment formed at the bottom of the bottle; this and another circumstance led me to examine more carefully the powdered gum I had in stock. The other circumstance was this: one of our medical men, who had used my emulsion combined with hypophosphite of lime, remarked that lately my emulsion had caused, in some cases in which he had prescribed it, symptoms of indigestion. Another batch of emulsion was put on with a powdered gum obtained from a different source, which resulted in a total failure to produce an inseparable emulsion. A little of this gum, about ·2 gram, was shaken up with about 2 c.c. of water, in which it dissolved instantly; the solution was then boiled, and when cold a drop of iodine solution was added to it, which produced no change, except a little coloration, due to the iodine solution. A little of the powdered gum was placed on a glass slide, stirred up with a drop of glycerine, and a glass cover placed on it, and examined under the microscope with a quarter-inch objective, and also with a sixth by transmitted light, but nothing was observed except the angular pieces of the powdered gum, so that the failure to produce an emulsion with this sample remains at present unexplainable.

I then examined the sample of gum which gave the white emulsion. I noticed that on shaking up the same quantity with the same quantity of water (·2 gram to 2 c.c. water) that it did not dissolve until heated to boiling. On cooling and adding a drop of iodine solution a deep blue colour was produced. A second quantity was shaken up with water, allowed to stand for a minute or so; the clear portion poured into a test tube and boiled, allowed to cool. A drop of the iodine solution added to it only gave a very blue tint. The undissolved portion was boiled with a little water, cooled, and on adding a drop of the iodine solution a deep blue colour was produced. So far it seemed quite clear that this sample of powdered gum was mixed with starch. On examining it under the microscope, both with glycerine and Canada balsam, not a starch granule could be detected, and it was only by examining it carefully by polarized light with an eighth objective that I was able to detect one or two starch granules that I could be certain about. I begin to think that

dextrine might be the adulterant. But it is well known to microscopists that the dextrine, especially the white usually met with, contains a large percentage of unbroken starch granules, and on examining some white dextrine I had in stock I was surprised to find it consisted nearly entirely of unbroken granules of wheat starch, so definite and so plain as to form what a "microscopic" friend of mine termed a beautiful slide of wheat starch, so our adulterant evidently could not be ordinary white dextrine. I may mention *en passant* that while working at starches I examined my pulvis amyli, which was bought for wheat starch, and I found it was maize starch. I merely mention this to show how important an instrument the microscope is in pharmacy.

The conclusion I have come to respecting the adulterant in the powdered gum is that it is rice starch, and a subsequent examination led me to estimate as nearly as I could that it existed in the sample to the amount of about 15 per cent. The granules of rice starch are exceedingly small, and when mixed with powdered gum are very difficult to detect. I will send you the slides of the several starches and gums, so that they may be examined by any person interested in the matter.

I thought it important to call the attention of pharmacists to this new form of adulteration, which I have not myself seen noticed, so that they may be on their guard, especially as powdered gum is at a very high price at the present moment.

This adulterated sample was bought of a wholesale firm as the very best, without any restriction as to price, as it was wanted, as stated when ordering it, expressly for making cod liver oil emulsion.

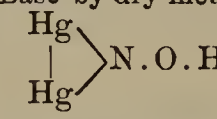
I need not add one word respecting the importance of examining every article before allowing it to go into stock, nor of the usefulness of the microscope in every chemist's business.

NOTES ON MERCURY-AMMONIUM COMPOUNDS.*

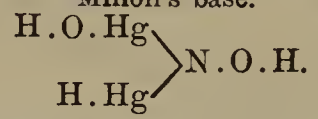
BY C. RAMMELSBERG.

1. *Mercuric Oxide and Ammonia.*—Yellow amorphous mercuric oxide was employed for the experiments. If gaseous ammonia be allowed to act upon it at common temperatures, a pale yellow product is obtained, the analysis of which corresponds with the formula $2HgO + NH_3$. This compound is very stable, and does not lose any ammonia in the air or on boiling with water. Even strong bases, like sodium hydrate, liberate, on continued boiling, only 0·23 per cent. of ammonia. Kept over lime, concentrated sulphuric acid or phosphorous pentoxide, the loss in weight becomes constant after some time, and the substance assumes a light-brown colour. The weight lost indicates that $2HgO + NH_3$ liberates one molecule of water on drying, and is thereby converted into Hg_2ONH. It is very probable that $2HgO + NH_3$ is the hydrate of mercury-ammonium hydroxide, thus: $NHg_2{\cdot}OH + H_2O$. It presents all the properties of a base, as will be seen further on. If mercuric oxide be treated with ammonia-liquor in the heat or in the cold, a pale yellow product is obtained, which is usually called "Millon's base." According to Millon it has the formula $2HgO + NH_3 + H_2O$, whereas the analysis of the author points to the formula $3(2HgO + NH_3) + 2H_2O$. Dried over sulphuric acid, it loses its water and becomes identical with the base obtained by the dry method. But whereas the latter loses its water, if dried at common temperatures, Millon's base loses under similar conditions, at first only two-fifths of its water, and the rest on warming only. Millon's base, therefore, retains a portion of its water more firmly than the base produced by the dry method. However, both bases yield with acids identical salts. The two compounds may have a different constitution; thus—

Base by dry method.



Millon's base.



2. *Mercury-Ammonium Chloride.*—Dilute hydrochloric acid changes the two bases into an insoluble yellow chloride. It is also obtained by boiling the so-called "white precipitate" with water or sodium hydrate. It has the formula $NHg_2{\cdot}Cl + H_2O$. Its water is only completely given off at 200° C.

3. *Double Salts of Mercury-Ammonium Chloride and Ammonium Chloride (White Precipitate).*—Mercury ammonium chloride combines with ammonium chloride in two proportions. Both compounds are called white precipitate. They are decomposed by warm water, ammonium chloride going into solution and mercury-ammonium chloride being left behind. The compound of the latter with one molecule of ammonium chloride does not fuse on heating, and is called "infusible precipitate," whereas the compound containing three molecules of ammonium chloride fuses on heating, and is termed "fusible precipitate." The latter can be made from the former by boiling with ammonium chloride solution. Amorphous mercuric oxide and Millon's base are converted into fusible precipitate by boiling with ammonium chloride.

4. *Mercury-Ammonium Sulphate.*—Millon's base changes on boiling with dilute sulphuric acid into an insoluble pale yellow sulphate, which turns grey in the light. Its formula is $(NHg_2)_2{\cdot}SO_4 + 2H_2O$.

5. *Mercury-Ammonium Nitrate.* If the mercury-ammonium base be heated with dilute nitric acid, it forms a yellow insoluble nitrate of the formula $NHg_2{\cdot}NO_3$. It appears to be identical with the product obtained by treating mercuric oxide with a solution of ammonium nitrate.

6. *Mercury-Ammonium Carbonate.*—The base boiled with a solution of sodium carbonate forms a white carbonate (normal), $(NHg_2)_2CO_3 + 2H_2O$. It is also obtained from mercuric oxide and ammonium carbonate.

7. *Mercury-Ammonium Phosphate.*—Boiled with an excess of phosphoric acid, the base is converted into a yellow phosphate, which becomes grey in the light. It is a basic salt and has the formula—

$$\left\{\begin{matrix}(NHg_2)_2PO_4\\ 2NHg_2{\cdot}OH\end{matrix}\right\} + 10\,H_2O.$$

8. *Mercury-Ammonium Bromate.*—If ammonia be added to a solution of mercury bromate, a yellow precipitate is obtained which has the formula—

$$2(NHg_2{\cdot}BrO_3) + 3H_2O.$$

On heating it is decomposed with a loud detonation.

9. *Mercury-Ammonium Iodate.*—Amorphous mercuric oxide digested with aqueous iodic acid, is rapidly converted into a white iodate, HgI_2O_6. If the latter be heated with ammonia-liquor it turns yellow. The analysis of this yellow product presents great difficulties and the figures obtained point to the formula—

$$\left\{\begin{matrix}NHg_2IO_3\\ 2(NH_4{\cdot}IO_3)\end{matrix}\right\}.$$

10. *Mercury-Ammonium Periodate.*—Mercuric oxide treated with periodic acid in excess, is changed into pentamercury periodate $Hg_5I_2O_{12}$. The latter, digested with ammonia, yields a light yellow substance, the analysis of which is very difficult. The figures obtained point to the formula—

$$\left\{\begin{matrix}2\,(NHg_2{\cdot}IO_4)\\ NHg_2{\cdot}OH\\ NH_4{\cdot}OH\end{matrix}\right\} + 3H_2O.$$

* From *J. Prakt. Chem.*, xxxviii., 1888. Reprinted from the *Journal of the Society of Chemical Industry*, March 30.

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REPORT ON THE BRITISH PHARMACOPŒIA.

IN accordance with the recently-established plan of submitting to the Medical Council a periodical report on matters of research that have a bearing upon the British Pharmacopœia, and on other subjects relating to medicinal preparations which have received prominent attention, the report for the year 1888 has been prepared by Professor ATTFIELD, and we are indebted to the courtesy of the Registrar of the Medical Council for a copy of this document. Among the subjects dealt with, a prominent place is assigned to the difficult and important one of the strength of medicinal preparations, and reference is made to the recent insertion of the terms "paregoric" and "laudanum" as synonyms for "compound tincture of camphor" and "tincture of opium" as a step that has been welcomed generally by those chiefly concerned in the supply of drugs. The terms "paregoric" and "laudanum" have lately been used somewhat loosely, but there can be little doubt that they should be restricted to the corresponding preparations of the Pharmacopœia. Though it is in the interest of the pharmacist that he should endeavour to impress upon the public the fact that, irrespective of the Food and Drugs Act, he is bound to supply medicines of the British Pharmacopœia compounded according to the formularies of the said Pharmacopœia, and on that account may be better relied upon than other vendors of medicines with similar names, cases have occurred to show that sufficient attention has not always been paid to this necessity. It must therefore tend to the general advantage of the public, as well as the pharmaceutical body, that by the insertion of these synonyms in the Pharmacopœia all doubt has been removed as to what should be understood by them. The satisfactory result of this step is however considered in the report as suggestive of a similar course being taken with the popular names of other preparations, so as to establish the Pharmacopœia as a standard of strength for household medicines. These are the precise words in which the subject is put forward for consideration in the report, but they obviously cover only a portion of the ground, inasmuch as there are several household medicines in regard to which their character, or "nature and quality," must be taken into account as much as, if not more, than the mere matter of strength. As illustrations of this necessity we may mention the preparations commonly known under the popular names of "milk of sulphur," "sweet spirit of nitre," and "sal volatile." Here we have articles presenting very distinct differences from the preparations of the British Pharmacopœia most nearly corresponding to them, and in judging whether or not they are of the proper "nature and quality," it is not simply their strength that must be considered, but also various points as to composition, admixture, flavour and even appearance. Household medicines of this kind would appear to present a legitimate claim to be regarded as outside the scope of the rule very properly laid down for medicines of the British Pharmacopœia. There are several reasons to be found for thus regarding household medicines of the kind represented by the articles above mentioned. There is, in the first place, no positive objection to urge against these preparations. Some of them are familiarly known to the public as domestic remedies, and they have been in very general use for a century or more. There are authorities who have maintained that these preparations are preferable to those of the British Pharmacopœia, and in regard to milk of sulphur and sweet spirit of nitre so high an authority as Professor REDWOOD is among the number.

So far as the use of these preparations as domestic remedies is concerned, it is not altogether clear why the public should be prevented from continuing it if that be desired. Each one of the preparations above mentioned has been replaced and superseded in medical and pharmaceutical application, and from those points of view it cannot be denied that we have in their place improved preparations. In the dispensing of prescriptions these are the only preparations which may be used, and when demanded as medicines of the British Pharmacopœia these alone can be lawfully supplied. But while fully admitting the propriety of the obligations thus imposed upon pharmacists, and while recognizing the advantage of defining the meaning of such popular terms as "paregoric" and "laudanum" by making them synonyms for "compound tincture of camphor" and "tincture of opium," there seems to be some reason for taking a different course in regard to household medicines such as milk of sulphur, etc. The tinctures just mentioned are not different from the corresponding preparations of older pharmacopœias, and the point of especial importance is that they should be uniform in strength. That object is best secured, and justifiably secured, by making the Pharmacopœia the legal standard. But it is at least open to question whether, in the case of milk of sulphur, sweet spirit of nitre, etc., uniformity of strength is of the same importance, and on that account

alone there would not be the same reason for making those popular terms synonyms of "precipitated sulphur" and "spirit of nitrous ether." Moreover the last-named preparations are quite different in several particulars from the more generally known articles which correspond to them and are in numerous instances preferred by the public as household medicines to the medicines of the British Pharmacopœia. It would appear to be attempting too much if, under the plea of establishing a uniform standard of strength for medicinal preparations in which strength is important, the British Pharmacopœia were made to prohibit the use of what is commonly understood by the term "milk of sulphur," yet such would be the case if that term were made a synonym of "precipitated sulphur."

Another household medicine mentioned in the report is sweet spirit of nitre, and it is suggested that the public would unquestionably be benefited if there were only one strength of that article supplied by vendors. To some extent this suggestion is supported by Dr. LEECH's demonstration that nitrous ether is the only active medicinal agent in this preparation, and by the facts that the official variety of it contains much more nitrous ether than the popular variety. But what would in reality be the effect of making the popular term "sweet spirit of nitre" a synonym of the preparation of the British Pharmacopœia? It certainly would not obliterate the objection of the public to accept the official preparation as being of the "nature and quality" of that generally demanded. It would, in fact, amount to little more than a nominal confusion of the popular variety with the official one. As a synonym of the Pharmacopœia preparation "sweet spirit of nitre" would have no further meaning than that it denoted the particular sweet spirit of nitre of the British Pharmacopœia. Its adoption would not do away with the possibility of there being another kind of sweet spirit of nitre, and it would not effect any conversion of the public from belief in, and preference for, an article entirely different from that of the Pharmacopœia. It would still remain questionable whether sweet spirit of nitre was necessarily a medicine of the British Pharmacopœia. It seems, indeed, idle to lament in this respect, as unfortunate, the present state of the law intended to ensure the supply to a purchaser of the article which he "demands," and upon theoretical grounds to assume that the demands of the public are ill-founded and ill-judged. Nor is there any more reason for urging the adoption of an arbitrary standard for a household medicine, in opposition to popular taste, because a certain class of purchasers of it, in the exercise of a debased choice, prefer the more alcoholic and least medicinal form of it. These are circumstances which appear to be beyond the scope of regulation by pharmacopœia standards. However much pharmacists as a body would be likely to welcome action on the part of the Medical Council that would tend to improve the present state of things in regard to the uniformity of medicinal preparations, and the maintenance of pharmacopœia standards for all the official preparations supplied and used in the dispensing of prescriptions, we venture to think that there would be a very general feeling of objection to any such extension of the principle of compulsory standards to non-official preparations as has been from time to time suggested as desirable by public analysts from their point of view. Even the enormity of paregoric without opium is less to be deprecated than the ignorance of those who can thus be induced to obtain it from an improper source, and it is to be hoped that in the future a better appreciation of pharmacists as servants of the public may furnish a remedy for both these and other evils affecting the supply of medicines.

The extent to which correspondents in this week's Journal deal with Mr. B. Bryan's circulars in reference to his interference with Council election on the pretext of protecting animals from vivisection does away with the necessity for offering any further remarks on that subject. Some of the letters that have reached us in reference to it we are unable to insert for want of space, but we are glad to find that a very general feeling of disgust and indignation has been raised among the members of the Society. To use the words of one of our correspondents Mr. Bryan "may rest assured that though he seems to have found a few jelly fish at the outset, they will not serve as a nucleus for future machinations."

* * *

Among the honorary distinctions the Queen has been pleased to confer upon the occasion of her 70th birthday, Professor Stokes, M.P., President of the Royal Society, has been made a baronet of the United Kingdom; Sir William Jenner, Bart., K.C.B., M.D., one of the physicians in ordinary to Her Majesty, has been promoted to the Civil Division of the First Class of the Most Honourable Order of the Bath as a Knight Grand Cross, and Dr. James Bell, F.R.S., Principal of Laboratory Department Inland Revenue, and Dr. James Reid, Physician Extraordinary to Her Majesty, have been appointed to the civil division of the third class as companions of the said Most Honourable Order. Dr. Reid has also been appointed one of the physicians in ordinary to Her Majesty.

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In answer to numerous inquiries for copies of the Price List issued by the Liverpool Chemists' Association the committee charged with its preparation wishes it to be known that a new edition is being prepared and will be ready at an early date.

* * *

The Croonian Lectures, on the "Connection between Chemical Constitution and Physiological Action," will be delivered by Dr. T. Lauder Brunton, in the Royal College of Physicians, on Thursday, June 5th, and four following Thursdays, at 5 o'clock.

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The next meeting of the School of Pharmacy Students' Association will be held on Thursday, June 6, when Mr. G. S. Fuller will read a short note on "Telephones," and Mr. A. Latchmore will read a paper on "Spectrum Analysis."

Pharmaceutical Society of Ireland.

SPECIAL MEETING OF THE COUNCIL.

On Monday, May 27, a special meeting of the Council of this Society was held at the rooms, No. 11, Harcourt Street, Dublin, at 3 o'clock, for the purpose of "receiving and considering the Draft Pharmacy Act (Ireland), 1875, Amendment Bill, prepared in accordance with resolutions passed at the special meeticg of the Council held on the 13th inst., and the report of the Committee thereon." The President, Mr. James E. Brunker, M.A., in the chair. The other members of the Council present were Messrs. Beggs, Wells, McCormack, Grindley, Merrin, Hodgson, Hayes, Allen and the Vice-President, Mr. Draper.

The President said: Gentlemen, the occasion of the present meeting is this. At the last special meeting it was decided to submit the Draft Bill sent up by the Belfast chemists and druggists to a committee consisting of myself, Mr. Draper, Mr. Wells, Mr. Grindley and Mr. Allen. That committee went through the clauses of the Bill, and you have the result, as printed and circulated, on the table.

Mr. Grindley: Perhaps it is right that I should rise to a point of order that I gave notice of. I hold that according to the regulations laid down as to specially-summoned meetings of the Council, this meeting is not legal, and the last certainly was not. In the regulation laid down by the Council with respect to the summoning of the members of the Council, it is stated that the notice of the meeting must be posted to the registered address of the member four clear days before the time of meeting. Four clear days since that posting have not elapsed, as Sunday has intervened. The same thing occurred at the last special meeting. I am advised by a very able man, who is well up in all such matters of form, that I have good ground for this objection,—that Sunday is not a "day" in connection with municipal board meetings or parliamentary meetings.

The President: In reply to that, I may say that I am perfectly clear on the point, for the question was raised last autumn, with reference to a special meeting, and the law adviser of the Council being present, was asked if Sunday counted as a day in the "four clear days" required as notice of a meeting, and his reply was that Sunday could be counted. I have not, therefore, acted without advice.

Mr. Wells: Who was the law adviser that gave that opinion?

The President: Mr. Clay. But I was not here. Mr. Ferrall, did not you put this question?

Mr. Ferrall: Mr. Clay gave the opinion before the notices were sent out. He stated clearly that Sunday would count as one of the four days.

Mr. Grindley: Please take a note of my objection.

Mr. Hayes: We have met not to discuss a subject like this, but to consider the Draft Bill.

Mr. Wells: But we should do so in legal form.

The Vice-President: Do you want to make the meeting illegal for some object that I would like to understand?

Mr. Grindley: That is not my object. I want to keep the Council right.

Mr. Wells: Any money that the President should pay away at this meeting would be illegally paid.

The Vice-President: There seems to be a positive want of confidence in the President's judgment.

Mr. Wells: Mr. Grindley and I mentioned the matter at the Committee meeting.

The Vice-President: There is no use in mincing the matter; for some object or other two or three gentlemen want to make this meeting illegal.

Mr. Hayes: When were the notices sent out, Mr. Ferrall?

Mr. Ferrall: On Wednesday.

Mr. Beggs: Members have written up from the country to say that they cannot attend on such notice. It is not fair to members in the country to summon three special meetings in the one month.

The Vice-President: That is something like a reason.

Mr. Wells: I have a letter from a gentleman saying that he was unable to come up owing to the shortness of the notice.

Mr. Hayes: If the meeting were not held until to-morrow would he be here?

Mr. Wells: He would; and he would have been at the last meeting if it had been held a day later.

The President: To come back to what is practical—the point has been raised that the notice of this meeting was not sufficient. I rule that it was sufficient, having been so advised.

Mr. Grindley: Please take a note of my objection.

The President: Mr. Ferrall will take a note. At a meeting of the Committee held on May 17, 1889, all the members being present, a letter was read which had been addressed to the Chemists and Druggists' Association, telling them the result of the Council's proceedings at last meeting, and informing them that the section relative to the annual fee should be reinstated. Their reply, objecting to two years' service, and agreeing to the view of the Council as to title, provided their demand as to one year's service should be conceded, was also read. The amended Bill was gone through and brought into accordance with the directions given by the Council at the last meeting. The Committee has also before them the following memorandum of a conversation that took place on May 15 between myself and Mr. Draper, on the part of the Pharmaceutical Society, and Mr. S. P. Boyd and Mr. W. I. McNeight, on the part of the chemists and druggists of Dublin, the meeting having taken place in consequence of an invitation given by these gentlemen:—"The Registrar's letter of 13th instant detailing the decisions of Council meeting on that day being under consideration. (1) The treatment of clause 4 was mutually agreed. (2) An alteration in wording of clause 5 agreed to, 'their assistants' being replaced by the words 'assistants to chemists and druggists.' (3) The annual fee of 10*s.* 6*d.* provided by clauses 10 and 11 of original Bill to be retained, the registration fee to be 10*s.* 6*d.* only. (4) A suggestion from Belfast that a year of grace should be allowed for the easy admission of pharmacists was negatived. (5) The service of a chemist and druggist with a pharmaceutical chemist to be one year, as in the Draft Bill, the representatives of the chemists and druggists not admitting that two years had been conceded at the Conference. (6) Clause 15 of Pharmacy Bill to be repealed. The above agreed on between the parties who undertake to recommend their adoption to the bodies which they represent." The representatives of the two bodies of course could not bind the latter on these points; they simply undertook to recommend. The Committee had the Bill before them and did not accept the suggestion as to clause 9; and you see the marginal note printed on the Bill in consequence. You have the Bill now before you, and it is for you to say what course you will adopt. I think it advisable to read the following telegram, which I received from Sir James Hazlett since I came into this room:—"If Wells correctly reported, page 721, *Chemists and Druggists' Journal*, useless attempt Bill. We would not share cost bringing in measure which section of your own body would oppose. Title chemists and druggists also where used must be protected." That means, as far as I can understand, that some of the Belfast men are not satisfied with the provisions in the Bill as printed here as to title. Some of them who have been in the habit of using the title "chemist and druggist," even subsequently to 1875,

want to carry it on. I am not prepared to say how far that objection is going to be carried.

Mr. Hayes: That would not agree with our arrangement with them. It must mean the chemists and druggists protected by the Act of 1875.

The President: No, that is clearly provided for. I am aware that after Sir James Hazlett went home he met with opposition from some of the Belfast people, who thought he had gone too far in the direction of giving up title. This telegram raises a very serious point. The agreement as to joining in the expense of promoting the Bill was clearly contingent on the agreement come to at the conference being honourably carried out. Any alteration in that agreement made on either side now clearly absolves the other side from the agreement to join in the expense of the Bill; and the chemists and drugggists, if there is going to be a declared opposition on the part of any section of the pharmaceutical chemists, are perfectly justified in withdrawing from the agreement, and—*solvuntur rasu tabulæ*.

Mr. Wells: As some remarks of mine drew forth that telegram, I would like to make a few observations. I have told the Council all along to bear in mind that it is not alone the druggists of the North of Ireland that they have to keep in view. You have a large number of your own licentiates through the country to consider also; and it is well known, in fact anybody reading the reports can see, that a certain number of the Council are not in favour of the rights of those licentiates. Your licentiates naturally feel aggrieved at this, and I think very properly so. When your Bill was before Parliament I had some communication —without having in any way sought for it—with the secretary of a society, who informed me that they had then Members of Parliament ready to block your Bill at any cost. I have to thank you for your ruling on a former day that we should not consider this matter in committee, because it was that ruling which enabled the licentiates to have a full report of what took place. Had your ruling been otherwise the matter would have been discussed in committee, and they would have been none the wiser. I have had another letter from a gentleman connected with this society, in which he speaks of this clause especially, and says that they are prepared to oppose the Bill tooth and nail, and will leave no stone unturned to throw it out. I told you that last day. You have the licentiates in the North of Ireland, and you have also a movement in Dublin. I had a letter from a gentleman in Dublin asking us, would we aid them in opposing the Bill. I think it right that you should know these things. Of course, if you like to rush for a Bill you can do so, but you will be only throwing your money away, and you will have yourselves to thank for it afterwards. We have heard something about this society going to become bankrupt. I think you are going the fair way about it. Your licentiates, who have been loyal to you up to this, and who have been subscribing their guinea a year, are getting very little value for it.

The Vice-President: Are there any members of the Society amongst the gentlemen who are making this opposition?

Mr Wells: There are. The gentleman who wrote the letter to me is a member of the Society, I believe, and a man who takes a great interest in pharmacy generally. It is very natural that these men who have been loyal to the Society and who have been subscribing for some years should discontinue their subscriptions. I say small blame to them if the Council are determined at the expense of these very men to exterminate them, for it means that in country places. I say that if you do so you cannot expect these men to give as they have given; and if you are minus thirty or forty guineas next year you will be in a very poor state. As to getting the Bill, we have been told over and over again that there is not a chance of getting it this session.

The Vice-President:—I ask you, are the two gentlemen who wrote to you licentiates and subscribing members of this Society?

Mr. Wells: One is a subscribing member. The other I am not sure about; but that he is a licentiate I am well aware, and that he is ably supported by the licentiates of his district. Another licentiate has taken the matter up.

The Vice-President: The interesting point is, are these gentlemen who are objectors subscribing members to the Society?

Mr. Wells: One is.

Mr. Hayes: You can test it now by asking Mr. Ferrall.

Mr. Beggs: In the face of this opposition, which I know myself is in the germ, I propose the following resolution:—"That this Council do not proceed with the consideration of the proposed Bill for twelve months." At the end of that time we shall be in a better position financially, and shall have had a more accurate consensus of opinion regarding the Bill.

Mr. Grindley seconded the motion.

The Vice-President: This is a crisis in the history of the Society. Nothing that could be said on the part of any other member would be likely to influence those who take the view represented by that motion, and therefore I suggest that without further preamble it be put to the vote.

The President put the motion, which was negatived by 6 votes to 5.

The Council decided as follows:—For the motion Messrs. Wells, Beggs, Grindley, McCormack and Merrin.

Against it—The President, the Vice-President and Messrs. Hodgson, Sampson, Hayes and Allen.

Mr. Hayes said he thought loyalty to the Society should make Mr. Wells try to influence the gentlemen to whom he had referred.

Mr. Wells: I have not lost my self-respect, and I will not compromise myself for anybody.

The President having declared the motion lost, Messrs. Beggs, Grindley, Merrin, Wells and McCormack left the room.

The President: It is perfectly evident, gentlemen, that there is not the slightest hope of our going on with this Bill—not the slightest, in the face of the obstruction that appears to exist—and therefore we must abandon it. At the conference the other day I thought we had arrived at a very fair result. The representatives of both sides appeared to be agreed; and some of the gentlemen who represented the extreme party on our side did not fight their corner as they appeared to be able to do in the absence of the enemy. The telegram from Sir James Hazlett clearly shows that they hold us strictly to the terms of the agreement as regards the payment of their portion of the expense of the Bill; and it is quite evident that with a section of the Council opposing this Bill we cannot expect the chemists and druggists to stick to the agreement. The action of these gentlemen now clearly shows that they will oppose the Bill through thick and thin, and we should be only throwing money away if we were to go on with it. I feel in this position. My first coming upon the Council was the result of an interview which I had with Mr. Pring, when he strongly expressed the view he entertained that the only way there was of placing pharmacy on a firm basis in the country was by introducing a grade of chemists and druggists. I agreed with him in that, and came on the Council to support that policy. Every day that has passed since has convinced me more and more that we shall never have pharmacy placed on a sure basis in the country until the grade of druggists is represented. I have been firm in that view for

twelve years. Last year I not only put aside my own views on this subject—as other members of the Council did who had fought with me—but we did our best to carry out the views of others. We were more succesful than we anticipated we would be, and we had carried the Bill to a second reading, when at the last moment an opposition developed which is now a most powerful opposition. We saw clearly that the will of the majority could not possibly be carried out, and I see now that all our labours for the last twelve years have been in vain. I have no hope in the future for the Society until legislation is accomplished. I have been for some time foreseeing what was about to occur; and I must now with great regret at the failure of the work of the last twelve years resign my seat on the Council.

The Vice-President: Of course I cannot but echo the regret which all of us must feel at such a *denouement* of the efforts of the Council to do what it believed to be right. I myself have loyally followed the President in his endeavour to guide this Society through devious channels, although I have always spoken my mind whenever I saw reason to differ from him. But I served him because I felt that in doing so I was serving the Society. And it is now with the deepest pain and with more emotion than I am in the habit of feeling about matters that do not concern myself, that I feel the necessity of following in his footsteps to the very last, seeing the impossibility of doing any good against such a marked opposition we have been experiencing for some weeks. I therefore am reluctantly obliged also to resign my seat on the Council.

Mr. Hayes: As the President and the Vice-President have spoken, perhaps I might ask them to reconsider what they have reluctantly placed before the Council. It will be a very serious matter, not only for the Council, but for the Society, at the present juncture if the two leading men on the Council give it up to the devices of those who have acted, I think, greatly against the interests of the Society, and I hope that for the sake of the Society and the Council they will reconsider the determination they have expressed. I do not see whom we could put in their places at the present juncture, and I think it would be a great pity to let the whole Society, which we all take such a deep interest in, get into a state of chaos through their resignation. I therefore earnestly ask them to reconsider the matter.

Mr. Hodgson: Mr. President, I follow in Mr. Hayes's footsteps. I feel greatly tempted to act as you have done, and resign my position on the Council, and I do not know what I may do yet in the matter, but I was one of the original members of the Council, and took an active part in obtaining the Act of 1875, through the instrumentality of a society of chemists and druggists, which at that time elected me their president. We carried on an agitation for a pharmaceutical Bill until the Government took the matter up, and eventually we succeeded in getting the Act of 1875. From that time to the present I have taken an active part in this Council. For a great many years you have annually done me the honour of electing me Treasurer, thus showing a certain amount of confidence in me. I have always done my utmost for what I conscientiously conceived to be the interests of the Pharmaceutical Society. As you are aware, Mr. President, I have always been an advocate for the two grades. I urged that at the very beginning, but was overruled in the earlier periods of the existence of the Council, and bowed to the majority. In the present Bill, as well as in the original Bill, there were many things that I did not like; but I acted loyally, and I think you will admit that I did so. [President: Hear, hear.] I kept back the points that I did not altogether agree with, and supported you loyally; as to the rest, not allowing the public at large to know that we were not altogether united in our views with reference to the Bill, as I thought that if it did get out that we were disunited, it might weaken your hands very materially. I would have been sorry to have done that, and consequently I kept back the opposition that I felt to some of the clauses of the Bill. I feel greatly pained at the result of to-day's proceedings; and I felt on the spur of the moment inclined to do what you have said you will do; but I think it would be well for us to pause a little before we do that. [Mr. Hayes: Hear.] Well, I have not made up my mind yet as to what I will do. I think it would be better to look at the matter, and calm down, and see what is best for us to do as members of the Council. I think we have a duty to perform to the Society at large. I do not think that gentlemen who have been on the Council from the beginning should hastily throw up their seats on it, because it might do the Society a very serious injury, which we should very much regret. I therefore ask our worthy President and Mr. Draper to hold over their determination, at all events for some time, not to make it a *fait accompli* to-day, but to pause and see what can be done. I earnestly entreat these gentlemen to adopt the suggestion of Mr. Hayes, and withdraw their resignations for the present.

The President: I am very much obliged for the suggestions that have been made; but this has not come upon me all of a sudden.

Mr. Simpson: Might I say that I should be very sorry that Mr. Brunker and Mr. Draper resigned at the present moment. Mr. Brunker has the whole matter of this legislation at his fingers' ends, and I do not see how we could do without him.

The President: I can only repeat that this matter has not come before me at the moment. It has been for some time before my mind as to the step it would be necessary for me to take. When I accepted at your request the Presidency last October, I had fair hopes that by the time my office expired I should have seen some legislation. We have been working for some months in the face of great obstruction to try and get our Bill shaped out. It is drafted now and is the fairest settlement of the pharmaceutical question in Ireland that could possibly be attained. I believe that in every succeeding year that passes, legislation, if attempted, will be more unfavourable to the gentlemen whose interests have been so warmly championed here to-day. My only wish in connection with the Society during the time I have been connected with the Council, has been to have the law of pharmacy placed on a firm basis. I have done my best to bring about that. I see it is hopeless to expect that anything further can be done by me; and I may add now, that after having given a good deal of time and attention, and sacrificed in some respects my own interests in looking after those of the Society, I do not see my way to continuing in what I consider is a false position, because I could only be the instrument of a party in whose views I cannot concur. I may tell you that from the moment I saw the difficulties that have been placed in the way of legislation this year I made up my mind absolutely that if legislation did not go on this session I should resign my seat on the Council. I believe that the crisis has come now; and having made up my mind to it, with thanks to you for your kind request that I should reconsider my determination, I must only say that I cannot do it.

Mr. Hayes: Perhaps the President would defer deciding finally until after to-day.

The Vice-President: I may reiterate what the President has said that this thing has not come suddenly upon either of us. It has been meditated that it must come some day. Surely we have been treated very badly indeed by what is practically the majority of the Council, though nominally the minority, in leaving this table. We have been treated with a certain amount

of contumely which is a very bad reward for all that you have done during a series of years. I feel myself, personally, and you must feel, that it would be very difficult for us to work here under the circumstances. Even as a matter of personal feeling, we both feel that to leave the Society at such a juncture is the last thing that is desirable; but there are some considerations that overrule even the public good.

Mr. Hayes: Well I think we ought to lay aside personal considerations.

The Vice-President: I assure you I did not intend to convey that there was personal feeling in it.

Mr. Hayes: I have felt that I would like to resign my seat on the Council, not within the last few months, but for some time before. I have kept on from a sense of duty and a desire not to give up to those who have become obstructionists in our legislation and other matters, and have taken a hole-and-corner view of the matter. I trust, however, that we will lay aside any personal feeling and not throw up the Society, and allow it to pass into the hands of those who certainly will not do honour to the Society or to the Council.

The President: I am afraid, Mr. Hayes, you cannot shake me. Any time that I find the Society clothed and in its right mind I will be very happy to help again; but at present it would be only throwing away time and worrying oneself.

Mr. Hayes: You do not resign your seat as a member of the Council?

The President: I think it better to do so. It would be only causing friction if I were to sit here at present.

Mr. Simpson: Does Mr. Draper intend to remain?

Mr. Draper said he did not.

The proceedings then terminated.

Provincial Transactions.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

The annual general meeting of the members and associates of the Midland Counties Chemists' Association was held at the Mason College on Tuesday, May 21. Mr. George E. Perry (retiring President) occupied the chair. There was a large attendance.

Annual Report of the Council.

The President presented the annual report of the Council, which stated that the Association now numbers 148 members and associates, being an increase over the previous year. The session was opened at the Mason College, by Mr. George E. Perry, who delivered his Presidential address on October 23, taking for his subject, as in the previous year, "The Position and Prospects of Pharmacy." There had been seven meetings held, at which papers on various subjects had been read, and these and the subsequent discussions had been prominently recorded in the journals devoted to pharmacy, as also in the local press. During the past session the meetings had been held in the rooms of the Mason Science College, to the convenience and advantage of the members. The Library had been much used during the year, and in future the books would be kept in the Society's new book-case in the West Corridor of the Mason College. No classes had been held during the year owing to the required number of students not being forthcoming. This had been a matter of great regret to the Council, the technical education of its younger members being considered amongst the primary objects of the Association. The Council desire to record the signal success of the supper, and also of the eighteenth annual ball, which was held at the Edgbaston Assembly Rooms, a favourable balance of £13 6*s*. 2*d*. being the result. The Council was also glad to report that it had been found necessary to distribute only a small amount from the Benevolent Fund during the past year. During the session a cricket section had been started under the auspices of the Council, and several matches had been played. The expenses exceeded the income by £1 2*s*. 2*d*., due to the purchase of cricketing materials to the value of £4 0*s*. 6*d*., which are now the property of the Association. The Council had met five times during the session, and had under discussion, *inter alia*, the subjects of the ambiguity of using the sign Oss. in prescriptions, the election of members of Council of the Pharmaceutical Society, and the Railway Rates Bill.

The Financial Statement for the year ending on the 21st of May, showed receipts amounting to £33 9*s*. 7*d*., which added to the sum of £23 12*s*. 7*d*., brought forward from the previous year, made a total of £57 2*s*. 2*d*. On the other hand the expenditure, including £20 5*s*. 0*d*. for a new book-case, amounted to £44 14*s*. 2*d*., leaving a balance in hand of £12 8*s*. 0*d*.

The President, in moving the adoption of the report and statement of accounts, said the chief feature of the year had been the establishment of the Society at the Mason College. It was a move in the right direction, and one that gave the Association a status which it had not before possessed. The report stated that it had not been practicable to carry on classes during the year owing to the requisite number of students not being forthcoming. The Council hoped, however, it would be possible to resuscitate them with the coming year. The balance in favour of the Association was not so large as that with which the year commenced, owing to the very large and extra expenditure that had been entailed, but there were assets to the amount of something like £30. An important matter which had been under the consideration of the Council had been the use of the term "Oss" in prescription. He had communicated with the General Medical Council on the subject, and the reply had been received that as the British Pharmacopœia laid it down that a pint was 20 ounces, and that the sign "Oss" was half that quantity, it was consequently pointed out that "Oss" meant nothing less than 10 ounces. He thought, on the whole, that the report was a satisfactory one.

Mr. Wyley seconded the motion, and expressed regret that more chemists and druggists of the midlands did not join the Association. The number of members ought to be twice as large as it was. He urged the necessity of the Association taking proper steps to place the question of railway rates on a proper footing.

Councillor Barclay explained that the establishment of the Association at Mason College entailed upon the members additional responsibility in the direction of pushing forward the more scientific aspect of their work. He alluded to the excellent papers which had been read by members during the session, and spoke of the necessity of the ranks of the Association being augmented. The future of pharmacy, there was no doubt, was in the direction of education. They had to look forward to an enforced curriculum, and the Association could do a great deal of good work in preparing the younger members of the trade, the students, apprentices and assistants, for that event. Speaking of the question of railway rates he said the great railway companies having been thwarted in imposing heavy rates upon the heavier branches of industry, were now endeavouring to make up the difference out of light traders like chemists and druggists. He referred with gratification to the increase in the number of members, and advocated the fostering of out-door amusements and excursions. There was no doubt, too, that chemists should unite. Their trade was so intricate and surrounded by so many difficulties that they should have a strong association to protect their interests.

The report having been adopted, the President then delivered his—

Valedictory Address.

Gentlemen,—I have now in my Presidential capacity to take leave of this Association, and to resign the charge which, two years ago, you generously placed in my hands.

Taking a survey of that period, conscious as I am that my own task might have been better performed, I think we have reason to congratulate ourselves that our Association has not, at any rate, "gone back." On the contrary, we are now stronger in members than at any previous time in our history: the attendances at our monthly evening meetings have been on the whole very good, while the papers contributed have shown no falling off either in number or interest. The conditions, however, affecting the practice of our calling, have not, I fear, been materially improved during that time. Competition from without is as rife as when I first had the privilege of addressing you, and that blissful millennium, when "pharmacy for the pharmacist" shall have become an accomplished fact, seems, unhappily, as remote as ever. Those of us who have spent some years "watching and waiting" in pharmacy, are, I think, now pretty well convinced that progress in such a direction must, from the very nature of things pharmaceutical, inevitably be slow. But there are others—the impatient spirits of pharmacy, if I may so term them—I have been myself, at one time and another amongst their number—who, I know, think otherwise. To those, therefore, I would commend a careful perusal of the proceedings at the Annual Meeting of the Pharmaceutical Society just held in London, and more particularly the very forcible remarks which were made by the President, Mr. Carteighe, on the several important matters brought forward for discussion. If they do not then come to the conclusion that with regard at any rate to the one or two burning questions which, for a long time, have agitated pharmacy, "it is better to bear those ills we have than to fly to those we know not of," I am afraid that anything I may say will have but little weight. The difficulties which on every side beset the path of the would-be reformer of the position of pharmacy are so great, and in many respects so insuperable, that even so experienced and competent a tactician as Mr. Carteighe, with the collective wisdom of the Council to boot, can devise no practical means of surmounting them.

And speaking of Mr. Carteighe, it was with feelings of indignation and shame, on opening my Journal on Saturday, I found that a man in our own body so eminent, who for the last decade at least has laboured so zealously—more abundantly than us all—in the cause of pharmacy, who has contended, and contended successfully, in season and out of season for the true status of the pharmacist amongst other scientific bodies, I say I was indignant to find that in return for all this, or perhaps, alas! because of all this, Mr. Carteighe had been placed almost at the bottom of the poll. It is fortunate for Mr. Carteighe that he did not happen to live in those bygone days, when enthusiasm in a good cause meant often a speedy transference to another, and that not a mundane sphere, else the next thing one might expect would be an order for his execution. It is a pleasing contrast to such ungenerous action and cannot but be in the highest degree satisfactory to this Association, that our respected Vice-President (Mr. Southall) occupies such a high—all but the highest—position on the list.

As a set off, forsooth, to the impatience and discontent to which I have alluded, we have, on the other hand, the supineness and indifference of a large number, even of members of the Society themselves, to say nothing of the still larger number of those who, for one reason or another, prefer to remain altogether outside the fold. This, I think, could not have been more clearly demonstrated than in the report of the Pharmaceutical Society, to which I have referred. We find there that out of the 3371 voting papers issued by the Secretary, no less than 1699—more than 50 per cent.—of those papers were never returned. In spite, however, of mistrust on the one hand, and apathy on the other, I think it will be admitted that a strong and representative Council has been elected, a Council representative of more than one phase of feeling in the pharmaceutical body. I am, therefore, the more confident—and I trust that you share in that confidence—that, whether from a professional or commercial standpoint, all will be done that can be done, not only for the "west-end" pharmacist, but for every sort and condition of pharmacist in the country. I say advisedly that doubtless all will be done that can be done, because it is as well that we should recognize, once and for all, that though certain things for which we have been long contending may be, as they are, desirable and just, still, do what we may, there is but the remotest probability of our being able to obtain them. I for one have always held, and still hold, that the distribution by the pharmacist, and by the pharmacist alone, not simply of poisons, but of the official preparations as well, would be a distinct public benefit; but it is very questionable, indeed it seems highly improbable, that in these days of free and unlimited distribution, such a restriction will for some time to come, if ever, be effected.

And so with other questions affecting us, the Medicine Stamp Act, the supply of medicated wines without the necessity of holding a special license, and other matters, the difficulty is in being able to effect such a change as we desire, without running the risk of bringing upon ourselves more dire calamities.

But though we may not be able by any legislative act to protect ourselves, and at the same time the public, to the extent we wish, and though we may not to any great extent be able to free ourselves from much of the present harrassing interference with the legitimate practise of our calling, still I am one of those who believe that pharmacy in spite of all will continue to hold her own. There is one thing—and it is an important factor in the success or failure of each one of us—there is one thing of which we cannot be defrauded, and that is, our individuality. An educated, and capable pharmacist is, generally speaking, practically certain to succeed, and his success to a large extent will be in proportion to his capability.

This is the view that is taken by those who have given the most thought and attention to the matter, men not outside our ranks, but men who are as dependent upon pharmacy for a livelihood as we are. It is to give effect to this view, to ensure that in the future a more highly trained body of pharmacists shall be available, not simply for the public benefit but for the well-being and greater security of the pharmacist, that the efforts of the late and previous Councils have been directed. It is for us as pharmacists, it is more particularly for us as members of the Midland Counties Chemists' Association, to strengthen the hands of the present Council in London—so thoroughly representative as it now is—in any further endeavour it may make to benefit the pharmacist, and to elevate the character and position of pharmacy in this country.

With regard to this Association, if it is to maintain its present efficiency, the work, let me remind you, must not be left to the few. It is well that we should have—as we fortunately have—energetic and hard-working secretaries; it is important that we should have a strong and capable executive; but it is equally necessary that every member should take as far as he is able a personal and active interest in the welfare and progress of his Association.

And now, gentlemen, I thank you, one and all, for

the kindness you have shown me during the time I have been connected with this Association, and more especially for the courtesy and help you have extended to me during my two years' occupancy of this chair.

Councillor Barclay moved a vote of thanks to the President for his services during the past two years.

Mr. G. Thonger seconded the motion, and it was carried with acclamation.

The President acknowledged the vote, and moved votes of thanks to the Vice-Presidents, the members of the Council, the Secretaries, and other officers for their services during the year. Professor Eliot seconded the proposition, which was agreed to.

Mr. Wyley, Mr. Alcock, and Mr. Thomson replied.

The following were elected officers for the ensuing year:—President, Mr. W. F. Wyley, F.C.S.; Vice-Presidents, Mr. Alfred Southall, F.C.S., and Mr. W. H. Pullin; Hon. Treasurer, Mr. Chas. J. Arblaster; Hon. Librarian, Mr. F. H. Alcock, F.I.C., F.C.S.; Auditors, Mr. F. H. Prosser and Mr. William Jones; Hon. Secretaries, Mr. Chas Thompson and Mr. F. H. Alcock. Council:—Mr. Thos. Barclay, Birmingham; Mr. Fred. Barlow, Mr. C. G. Crooke, Mr. Stokes Dewson, Mr. H. Howes, Mr. M. Magor, Mr. A. E. Robinson, F.C.S., Mr. Hinds, Coventry; Mr. Richardson, F.C.S., Dudley; Mr. J. T. Barrett, Leamington; Mr. Sellick, Stourbridge; Mr. Morris, Walsall; Mr. Gibbs, Wednesbury; Mr. Gibson, Wolverhampton; Mr. S. Taylor.

LIVERPOOL CHEMISTS' ASSOCIATION.

Railway and Canal Traffic Act.

The following objections to the proposed classification of merchandize traffic and schedule of rates and charges have been forwarded to the Board of Trade by the committee appointed by the Liverpool Chemists' Association, consisting of Messrs. A. H. Samuel, C. Symes, W. Wellings, T. F. Abraham, J. J. Evans and J. Bain:—

Objections to Revised Classification, Class 5, "*Drugs and Chemicals.*"—That goods are sold by chemists and druggists at less profit than formerly, and that it would be unfair to further diminish the profit by large increases in the rates of carriage. That the present rates are amply remunerative, and higher than those charged for similar services in other countries where the circumstances are comparable. That the increases proposed would, in many cases, force traffic which should naturally go by rail, to water and road conveyance, causing immense delay and inconvenience. It would be specially injurious in the case of the goods dealt in by the objectors, and highly prejudicial to the convenience of the public. That before the railways obtained control of the Grand Junction Canal, druggists' goods of the classes now proposed to be charged 104*s.* per ton, were carried for about one-fourth that rate between London and Liverpool. Packages of goods consigned to retail druggists are made up of a number of articles in classes C. 1, 2, and 3, such as alum, bicarbonate of soda, ammonia, cream of tartar, and vaseline, the proportion of the higher class articles being very small. The average value of the drugs is not greater, but rather less than many goods in lower classes, and less liable to damage in transit, being more securely packed. For these reasons we think that drugs should be classed lower and not higher than formerly. On all these grounds we object to the proposal to remove drugs and chemicals from class 4 to class 5.

Objections to Revised Classification, Class 5, "*Empty Cases, Casks, Crates, Hampers, and other Empties.*"—Chemists cannot carry on business without returning empty bottles, packages, etc., and seeing that they pay a higher rate on receipt, it is obviously unfair that on returning the packages they should have to pay the high rate chargeable in class 5, whereas they come under the rates already provided for in the lower classes. In some instances these high rates of carriage on returns will be in excess of the value of the article. For these reasons we object to druggists' empties being placed in class 5.

Objections to Revised Schedule of Maximum Rates and Charges, Part v, Small Parcels.—The proposal to make the additional charge on smalls 100 per cent., instead of 10 per cent or 15 per cent., as at present, is exorbitant, and especially oppressive to chemists and druggists, seeing that nearly the whole of the goods they use come under that definition—necessarily so on account of being required in fresh condition.

BRIGHTON ASSOCIATION OF PHARMACY.

A meeting of this Association was held in the ante-room of the Town Hall on Wednesday evening, May 22, Mr. W. D. Savage, J.P., in the chair. There was a small attendance of members.

After the minutes of the last meeting had been read and confirmed, the Treasurer (Mr. Cornish) presented his report, which showed a balance in hand of £28 0*s.* 9*d.*

A discussion next arose upon the proposed new railway rates, everyone concurring that if not modified they would most injuriously affect the trade.

Mr. W. W. Savage explained that the injustice of the new proposals consisted in: Firstly, in advancing the conveyance of cases, crates or hampers, from the third to the fifth class; secondly, the doubling of the new rates on all small parcels (under 500 lbs.), and the addition of terminal charges; thirdly, the increase in the charge for empties. The charge at present for the carriage of drugs between London and Brighton is 26*s.* 3*d.* per ton, including terminal charges; the charge according to the proposed rates will be 59*s.* 10*d.* per ton, with the further charge of 11*s.* per ton for terminals. At present "smalls" are charged 14 per cent. on the ton rate; in future they will be double the ton rate. At present empties are charged 3*d.* each; in future the minimum charge is to be 8*d.* to cover 1 cwt., rising 4*d.* for each ½ cwt. or part.

On the motion of Mr. Young, seconded by Mr. W. Cornish, it was decided that a summary of Mr. Savage's statement and the following resolution should be sent to the Pharmaceutical Council:—"That this meeting regards with satisfaction the efforts now being made by the Pharmaceutical Council to prevent the unreasonable increase of the railway rates."

It was next decided to again offer prizes to students attending the chemistry class at the School of Science and Art.

It was also decided to have the annual dinner on Friday, June 7, a small committee being appointed to make the arrangements.

Proceedings of Societies in London.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting of the Council of this Association held on May 27, the following gentlemen were elected to serve as officers for the ensuing session:—President, Mr. T. A. Ellwood, A.I.C., F.C.S., Vice-Presidents, Messrs. W. J. I. Philp and F. Ashley Rogers; Honorary Treasurer, Mr. C. J. Strother, and Honorary Secretaries, Messrs. E. Richards, F.I.C., and W. Lloyd Williams.

A vote of thanks was passed to Mr. C. J. Strother for his generous gift of the portraits of the Presidents of the Association from its formation to the end of the Twelfth Session.

Parliamentary and Law Proceedings.

Alleged Sale of Defective Sal Volatile.

On Monday, at the Bow Street Police Court, before Mr. Vaughan, Mr. Charles Ferdinand Keele appeared in answer to a summons taken out by the Inspector of Nuisances for the St. Giles's District under the 6th section of the Sale of Food and Drugs Act, 1875.

Mr. Howard Smith said the defendant carried on business as a surgeon and dispenser of drugs at 260, Tottenham Court Road. The summons was taken out under the 6th section of the Sale of Food and Drugs Act, 1875, which enacted that "No purchaser shall sell to the prejudice of the purchaser any article of food or any drug which is not of the nature, substance and quality of the article demanded by such purchaser under a penalty not exceeding £20." On the 16th of April, the complainant, Mr. Hoyle, went to the premises occupied by the defendant, and there saw an assistant, and asked for some iodide of potassium and 6 ounces of sal volatile, and it was with regard to the latter article that the summons was taken out. In accordance with the Act the Inspector stated that the purchase was made for the purpose of being analysed, and he divided it into three parts, of which the defendant was handed one. The article, instead of being of a certain strength, as it ought to be according to the British Pharmacopœia, had less alcohol and more than half less of ammonia. As Mr. Forrest Fulton appeared for the defendant, and would no doubt raise some question upon the legal aspect of the case, he thought it right to quote the authority of White *v.* Bywater, reported in the Queen's Bench Division, in which proceedings were taken under the same section for selling a tincture of opium which was not of the "nature, substance, or quality" of the article demanded by the purchaser. It appeared in that case that the drug that was sold as tincture of opium was deficient in opium to the extent of one-third, and in alcohol to the extent of nearly one-half, as compared with the standard prescribed by the British Pharmacopœia, and the magistrate who heard the case declined to convict. But it was held by the court that the defendant was liable to be convicted, although the purchaser had not specifically asked for tincture of opium "prepared according to the recipe in the British Pharmacopœia." The argument for the appellant in that case was this: The 15th section of the Pharmacy Act, 1867 (31 and 32 Vict. c. 121), prohibits the compounding of any medicines in the British Pharmacopœia, except according to the formularies of that Pharmacopœia under a penalty of £5. The magistrate was of opinion that he was not bound to convict the respondent, because at the time of the purchase the appellant did not specifically demand to be supplied with tincture of opium prepared in accordance with the British Pharmacopœia. In that case he did get tincture of opium, as in the present case the purchaser got a thing called sal volatile. Lord Coleridge, in delivering judgment in White v. Bywater, said this: "The question referred to us is, I think, disposed of by what is stated in the case. The evidence of three competent witnesses shows that the article supplied to the purchaser was not of 'the nature, substance, or quality' of the article demanded by him. It was proved, or admitted, that the tincture of opium supplied by the respondent was not in accordance with the standard quality prescribed by the British Pharmacopœia. I am, therefore, though somewhat reluctantly, bound to come to the conclusion that the respondent ought to have been convicted of the offence with which he was charged, and that the case must go back to the magistrate with our opinion to that effect."

Mr. Forrest Fulton: Would you mind reading the other judgment?

Mr. Smith: Certainly. Mr. Justice A. L. Smith said: "I am of the same opinion. The customer asks for 'tincture of opium.' That must mean the article known in commerce as tincture of opium. The thing supplied to him was not tincture of opium of commerce, but an article of very inferior substance and quality. That being so, the respondent was guilty of the offence charged, and ought to have been convicted." The Act of 1867 having been referred to it was necessary, in order that his worship should understand his contention, to call attention to two former Acts. The first was the Act of 1858 (21 and 22 Vict., cap. 90), commonly known as the Medical Act, which provided for the establishment of a Medical Council, and then by section 54 it enacted as follows:—"The General Council shall cause to be published under their direction a book containing a list of medicines and compounds, and the manner of preparing them, together with all true weights and measures by which they are to be prepared and mixed, and containing such other matter and things relating thereto as the General Council shall think fit, to be called the 'British Pharmacopœia,' and the General Council shall cause to be altered, amended and republished such Pharmacopœia as often as they shall deem it necessary." The next Act was the 25 and 26 Vict., cap. 91, which enacted:—"The British Pharmacopœia, when published, shall for all purposes be deemed to be substituted throughout Great Britain and Ireland for the several above-mentioned Pharmacopœias, and any Act of Parliament, Order in Council, or custom relating to any of such last-mentioned Pharmacopœias shall be deemed, after the publication of the British Pharmacopœia, to refer to such Pharmacopœia." The only recognized Pharmacopœia was the British Pharmacopœia. Then came the Act of 1868 (31 and 32 Vict., cap. 121), which prohibited the compounding of any medicines of the British Pharmacopœia, except according to the formularies of that Pharmacopœia, under a penalty of £5. That section was quoted before Lord Coleridge and Mr. Justice A. L. Smith, and was referred to in the judgment.

Mr. Vaughan asked why the summons had not been taken out under this Act.

Mr. Forrest Fulton said the Act prescribed that there should be a £5 penalty, but the summons had not been taken out under this Act, the complainant having proceeded under the Food and Drugs Act. The question was whether if a person sold a drug that was not prepared in accordance with the British Pharmacopœia, he came within the Food and Drugs Act. It had been thought desirable in the Pharmacy Acts Amendment Bill that clauses should be inserted making the Food and Drugs Act consistent with the Pharmacy Act by declaring the British Pharmacopœia to be the legal standard.

Mr. Smith: We do not know who the person is who compounded this article.

Mr. Forrest Fulton: We purchased it from the wholesale people, and it is in exactly the same state as we got it.

Mr. Smith said it was not necessary to proceed under that Act.

Mr. Vaughan thought the Act did not refer to the sale except the person selling was the compounder.

Mr. Smith said in the case of White *v.* Bywater the court said that inasmuch as by the 15th section of the Pharmacy Act no one could compound or ought to compound medicines except according to the British Pharmacopœia, therefore it must be taken as against the person who supplied the medicines to the general public, that they were to be such medicines as were compounded according to the British Pharmacopœia.

Mr. Vaughan said the defendant did not compound

the preparation, but sold it as he obtained it from the wholesale maker.

Mr. Forrest Fulton said in White *v.* Bywater the judges were bound to give their decision upon the point of law according to the findings. One of the findings there was as follows:—"They also deposed that the British Pharmacopœia was the only one recognized by the medical profession and by pharmacists generally." It was not suggested that the tincture of opium was made pursuant to any pharmacopœia at all, but was a mere compound. Dr. Redwood would admit that the sal volatile was made strictly in accordance with the formula prescribed by a Pharmacopœia, which had been in existence for fifty years. That was the distinction between the two cases.

Mr. Smith said sal volatile had been known by its technical name for many years, but since 1885, when the British Pharmacopœia was published, it was known by, not only the classical name, but the popular name as well,—they were synonyms. As a matter of fact, there was no substantial difference in the amount of ammonia provided by the Pharmacopœia of 1885, and that of 1887.

Mr. Vaughan asked whether it was proposed to go elaborately into the case?

Mr. Smith said he should. He should first submit as a matter of law that if he proved that the thing sold was not made according to the British Pharmacopœia, and was not of the same strength and substance as there prescribed, the magistrate was bound to convict. When people went to a chemist and asked for an article they expected it to be of the strength prescribed by the British Pharmacopœia.

Mr. Vaughan observed that the question of fact suggested by the defendant was that he purchased it from a wholesale chemist, and merely sold the article. Was it not a question of fact? If it turned out to be so he should merely impose the minimum penalty.

Mr. Forrest Fulton said this was really a test case, and it was very hard upon his client. The Vestry were trying to get a decision in order that the point of law might be settled. They wanted a conviction so as to see whether they could not get a decision from the Queen's Bench. In the *Pharmaceutical Journal* of December 8, 1888, there were new clauses suggested by Mr. Muir Mackenzie to be inserted in the Pharmacy Act Amendment Bill so as to set at rest the question whether the Pharmacy Act should not be incorporated in the Food and Drugs Act. In White *v.* Bywater the tincture of opium was not made up in accordance with any formulæ in the Pharmacopœia, but sal volatile was a Pharmacopœia preparation, only in the present case it was made up pursuant to the Pharmacopœia Londinensis, and not according to the Pharmacopœia Britannica.

The following evidence was then called on behalf of the complainant:—

John Hoyle, Inspector of Nuisances for the Board of Works of the St. Giles's District, and Inspector under the Food and Drugs Act, deposed that on the 16th of April, 1889, he called at the defendant's premises and bought from the assistant 6 ounces of sal volatile, for which he paid three shillings. He stated that the purchase was made for the purpose of being analysed, and having divided it into three portions, which were sealed and labelled, he left one portion with the defendant. On other days he purchased sal volatile from other chemists for which he paid 1*s.* 4*d.*, 1*s.* 8*d.*, and 2*s.*

Mr. Forrest Fulton objected to evidence being given of what the Inspector had done upon other days, and at other shops.

Mr. Smith said he would not press the point.

Professor Theophilus Redwood sworn, examined by Mr. Smith:

What are your qualifications?—I am Doctor of Philosophy, member of the Chemical Institute, and of the Chemical Society. I am also Emeritus Professor of Chemistry and Pharmacy to the Pharmaceutical Society of Great Britain, and public analyst to the Board of Works for the St. Giles's District.

Did you receive a sample of sal volatile from the last witness marked G55?—I did.

Did you make an analysis?—Yes.

In analysing what tests did you use?—I determined its specific gravity, and its neutralizing power.

Had you before you the British Pharmacopœia?—Yes.

I believe you are an editor of the British Pharmacopœia?—I have been editor of the British Pharmacopœia for some twenty-five years.

Mr. Vaughan: First of all let us have the analysis.

The Witness: "The sample has a specific gravity of ·91898, and 1 fluid ounce of it neutralizes 230 grain measures of the volumetric solution of oxalic acid, representing sal volatile the strength of which has been reduced by omitting part of the alcohol and a great part of the ammoniacal salt ordered in the British Pharmacopœia."

Mr. Vaughan: I should like to know what the component parts of genuine sal volatile are.

Mr. Smith: They are in the Pharmacopœia.

Mr. Vaughan: I would prefer to have it from the witness.—A solution partly aqueous, and partly spiritous of carbonate of ammonia with certain essential oils, nutmegs, cinnamon and lemon. It is therefore a stimulating alkaline solution.

Mr. Smith: As a matter of fact it is very largely used by the medical profession?—It is.

And it is known, I believe, as spiritus ammoniæ aromaticus?—Yes; or aromatic spirit of ammonia, or sal volatile—those names are synonymous.

And they so appear in the British Pharmacopœia?—Yes.

Mr. Vaughan: I do not see where the alcohol is. What alcohol is required?—A comparatively small proportion of the alcohol is absent. The principal deficiency is in the spirit of ammonia.

What alcohol should there be in 1 ounce which you analysed?—Estimating it as a rectified spirit, which is the term under which it is commonly used in the strongest form, there would be about one-third.

Mr. Smith: As a drug what is the most important ingredient in sal volatile?—The ammonia.

The alcohol is not so important?—No; that is merely used to keep the essential oils in solution.

Some people take sal volatile to prevent a cold, we know, but it is the ammonia which has that effect, is it not?—Yes.

Mr. Vaughan: I want to know what quantity of alcohol there would be in an ounce, and the witness says one-third.

Mr. Smith: What we complain of is the amount of ammonia omitted, not the alcohol, and the witness says the ammonia is less than what it should be according to the British Pharmacopœia.

The Witness: Less than one half.

Can you give the formula in the British Pharmacopœia from memory?—I can hardly venture to give it exactly from memory, although I have had a great deal to do with it.

Look at the book.—Carbonate of ammonia, 4 ounces; strong solution of ammonia, 8 fluid ounces; sal volatile oil of nutmeg, 4½ fluid drachms; oil of lemon, 6½ fluid drachms; rectified spirit, 6 pints; water, 3 pints.

Did you compare the sample in question with the British Pharmacopœia, and find it had less than half the ammonia which it should have had?—Yes, precisely.

Mr. Vaughan: What is the meaning of this passage: "It neutralizes 230 grain measures of the volumetric solution of oxalic acid, representing sal volatile the strength of which has been reduced by omitting part

of the alcohol and a great part of the ammoniacal salt ordered in the British Pharmacopœia?"—It ought to have neutralized according to the British Pharmacopœia 558 grains; it really only neutralized 220.

Mr. Smith: The magistrate is reading the test?—It is considerably less than half what it should be. It neutralized 220; it ought to have neutralized 558 of of the same acid.

Mr. Vaughan: That is the great test—the power of neutralizing oxalic acid?—Yes.

Mr. Smith: That is the test prescribed in the British Pharmacopœia?—It is.

According to the British Pharmacopœia that was not sal volatile as there prescribed?—No; certainly not.

Cross-examined by Mr. Forrest Fulton.

I think I am right in saying that the term "sal volatile" was first used in the Pharmacopœia Londinensis of 1720?—It was.

Then it dropped out of use, and the expression "spiritus ammoniæ aromaticus" was substituted in 1885 when the name was re-introduced into the Pharmacopœia Britannica?—Exactly.

The last edition of the Pharmacopœia Londinensis was in 1851?—It was.

I think I am right in saying that at page 413 of that Pharmacopœia there appears a formula?

Mr. Smith objected to the question, but Mr. Vaughan said it was one that might be put.

You are thoroughly acquainted with the work?—Thoroughly.

I believe at page 413 there is a formula given for compounding spiritus ammoniæ aromaticus?—Yes.

That is the sal volatile of 1720?—Yes.

There have been several editions of that Pharmacopœia. The latest edition is 1851?—Yes.

According to that formula this preparation which you analysed was made up and had the same specific gravity, ·918. You bring out the specific gravity as ·918?—Yes.

That is the specific gravity of the preparation in the London Pharmacopœia of 1851?—It is. Excuse me, the specific gravity of the spiritus ammoniæ aromaticus in the 1851 Pharmacopœia was lower than this sample.

Just look and see.—Yes, I see you are right. I am free to admit that the sample in question was substantially the same article as was ordered in the London Pharmacopœia of 1851.

The real test is the specific gravity?—Well, no; we go beyond that; the neutralizing power is very much more important. The neutralizing power of the preparation of the London Pharmacopœia of 1851 was nearly that of the sample in question; it was about one-half of the sal volatile of the British Pharmacopœia.

Mr. Vaughan: Does the difference in power of neutralizing arise from the diminution of the alcohol?—No, it arises from the salt of ammonia which is present—the ammoniacal salt. We use for ascertaining the neutralizing power a solution of oxalic acid, and a given volume of that solution has a certain power of neutralizing a given quantity of carbonate of ammonia which is contained in the preparation. If the quantity of the solution of oxalic acid required be reduced to 223, whilst the quantity required according to the British Pharmacopœia should be 559, it is quite obvious the strength of the preparation could be very much less than half of what it should be.

Mr. Vaughan: The neutralizing power became diminished by the diminution of oxalic acid? I do not understand that. You say it was the oxalic acid in it?—There is no oxalic acid in the preparation; the oxalic acid is merely used as a test to indicate what the neutralizing power of the preparation is.

Mr. Forrest Fulton: Were you present at the meeting of the General Medical Council in December last year?—No, I was not.

Do you still edit the *Pharmaceutical Journal*?—No, I do not edit it—I used to.

Do you still read it?—Yes, every week.

I think the question about the incorporation of the Pharmacy Act with the Food and Drugs Act has been a very vexed question in the profession for many years?—Yes.

Who is Mr. Frederick Willis Farrar—I am told he is the solicitor of the Council?—I suppose so.

Have you read his elaborate opinion written with regard to this matter?—I do not recollect it.

Will you just look at it. Do you agree with his advice, "That the Food and Drugs Act should be made consistent with the Pharmacy Acts by declaring the British Pharmacopœia to be the legal standard, acknowledged as it has been so amply, and for so long a time under orders in Council and Acts of Parliament, by a clause or words to that effect in the proposed amended Pharmacy Act"?—Practically I consider it to be so at the present time.

Do you agree with the suggestion here?—I agree that there ought to be a close relationship between the two; that they both should have the same object. I conceive that they have the same object.

That is a question of law upon which I will not ask your opinion. You know, as a matter of fact, that the Pharmacy Act of 1868 was not incorporated with the Food and Drugs Act of 1875?—I agree with that.

You agree it has been a moot question, and a great many cases have been taken up at different places with the view of getting a decision in the Queen's Bench upon the question of the Pharmacopœia Londinensis?—The London Pharmacopœia has been entirely superseded by the British Pharmacopœia, and that you will find explicitly stated.

At the same time you are aware it is still used?—I am aware that it may be used in a certain sense. I do not admit that any preparation which is ordered in the British Pharmacopœia would be correctly dispensed if it were not made according to the instructions in the British Pharmacopœia.

The Pharmacy Act, 1868, imposes a penalty of £5 upon any person violating the provisions of that Pharmacopœia?—Yes.

These proceedings are not taken under that section, but under the Food and Drugs Act?—If you will allow me to state what my opinion is—I am here to give it for what it is worth—I say that at the present time, and since the publication of the British Pharmacopœia, any article used in medicine which is ordered in that Pharmacopœia is required to be prepared according to the instructions therein given. If you order tincture of opium the tincture of opium must be of the precise strength in the British Pharmacopœia. It may have been very different in the London Pharmacopœia. Take, for instance, hydrocyanic acid, there is a strength indicated in the British Pharmacopœia; one of the pharmacopœias which preceded the British Pharmacopœia gave instructions for hydrocyanic acid to be nearly double the strength that ordered in the British Pharmacopœia. I say, therefore, that if anyone were to dispense hydrocyanic acid when it is ordered according to any other strength different to the British Pharmacopœia, he would commit a very grave offence, and it is the object of the Food and Drugs Act to obviate any such result as that.

Still, nevertheless, the Pharmacy Act of 1868 was not incorporated in the Act which was passed in 1875?—I leave that as a question for the lawyers. My own impression is that all the other pharmacopœias were entirely superseded and replaced by the British Pharmacopœia.

Re-examined by Mr. Smith.

In the British Pharmacopœia some of the drugs are diminished in intensity?—Yes.

And some others have increased?—Certainly.

Mr. Vaughan: Is the London Pharmacopœia looked upon as an authority in the profession?—Throughout the professions, both of medicine and pharmacy, the British Pharmacopœia is the authority and the only authority.

I am speaking of the Pharmacopœia Londinensis; is that an authority?—That has no authority now, none whatever; it has been replaced and superseded entirely by the British Pharmacopœia.

Do you say any person dispensing a prescription would be bound to make it up according to the Pharmacopœia Britannica?—Certainly.

Mr. Forrest Fulton: Would you ask him whether in ordering prescriptions it is sometimes stated that they are to be dispensed "P. L?"—I would admit that is sometimes done. If you were to order "spiritus ammoniæ aromaticus P. L." it would be understood that was a definition indicating the intention of the person ordering it that it should be made according to the London Pharmacopœia, but if there were no indication of what pharmacopœia should be followed, we admit no other pharmacopœia to be an authority now but the British.

Mr. Vaughan (to Mr. Forrest Fulton): Do you mean to contend that a preparation made according to the London Pharmacopœia is one that can be sustained?

Mr. Forrest Fulton: Yes; because in this case we were simply asked for sal volatile.

Mr. Vaughan: If there is any preparation ordered the British Pharmacopœia must be followed, unless there is some special instruction to the contrary; at least that is what I understand the witness to say?

The Witness: Yes.

Mr. Forrest Fulton said he should like to show how the defendant became possessed of this.

Mr. Vaughan said that was the only question of fact. He did not deny that if it were shown that the defendant honestly came into possession of the preparation, and he thought he was justified in selling it, believing it was of the proper strength according to the Pharmacopœia, it was a case in which a minimum penalty might be imposed.

Mr. Forrest Fulton said as it was impossible to finish the case that day he would consider before the hearing was renewed what course he should pursue.

The further hearing was adjourned until Saturday.

PHARMACY ACT (IRELAND), 1875, AMENDMENT BILL, 1889.

The following is the present form of the Draft Bill which has been the subject of conference between the Council of the Pharmaceutical Society of Ireland and the representatives of the Belfast Chemists and Druggists' Association:—

Whereas it is expedient for the safety of the public that all chemists or druggists keeping open shop for the sale of poisons should be registered, and that the Pharmacy Act (Ireland), 1875, should be amended,

Be it therefore enacted by the Queen's Most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons in this present Parliament assembled, and by the authority of the same as follows:—

1. *Short Title.*—This Act may be cited as the Pharmacy Act (Ireland), 1875 Amendment Act, 1889.

2. *Limit of Act.*—This Act shall apply to Ireland only.

3. *Interpretation of Terms.*—In this Act—

"The principal Act" means the Pharmacy Act (Ireland), 1875.

"The Society" means the Pharmaceutical Society of Ireland.

"The Council" means the Council of the Society.

"The Registrar" means the Registrar of the Society.

"The Treasurer" means the Treasurer of the Society.

"Poisons" mean all articles deemed to be poisons within the meaning of the Act 33 and 34 Victoria, chapter 26, intituled "an Act to regulate the sale of poisons in Ireland."

Words importing the masculine gender shall also include the feminine.

4. *Repeal of Section* 15 *of Principal Act*—Section 15 of the principal Act, and all other provisions of that Act empowering the Pharmaceutical Society of Ireland to create a grade of chemists and druggists legally qualified to dispense medical prescriptions are hereby repealed.

5. *Register of Druggists, and of Chemists and Druggists to be kept.*—The Registrar shall, in the manner by this Act provided, from time to time make out and maintain complete lists to be called "The Registers of Druggists and of Chemists and Druggists in Ireland," of all persons by this Act authorised to be registered as druggists or as chemists and druggists, and the provisions of the principal Act with respect to the registers thereby authorized shall *mutatis mutandis* extend and apply to such registers, except so far as such provisions are altered by or are inconsistent with the provisions of this Act. All persons so registered shall be entitled to keep open shop for the sale, retailing or compounding of poisons. Provided that nothing in this Act shall be deemed to confer on such persons any right to compound medical prescriptions.

6. *Chemists or Druggists practising as such, on their own account, prior to January* 1, 1888, *entitled to be Registered.*—Every chemist and druggist, or chemist or druggist, who has been practising as such in Ireland as a principal on January 1, 1888, or who has practised as such a principal during a period of not less than five years at any time previous to January 1, 1888, shall be entitled to be registered under this Act, on complying with the following provisions:—

(1) He shall, within a year from the passing of this Act, make application in writing to the Registrar to be registered under the provisions of this Act.

(2) Such application shall be accompanied by a statutory declaration of the applicant in the form set out in Schedule A to this Act. Provided that it shall be lawful for the Council to require from any such applicant such evidence as they may think fit of the truth of the statements contained in the statutory declaration so made by him, and to require such other confirmatory evidence as they shal lthink sufficient.

(3) He shall pay to the Treasurer of the Society a fee of half a guinea.

(4) Provided that every person registered under this section who was in business as a principal at the date of the passing of the principal Act, shall be placed on the Register of Chemists and Druggists; and shall be styled a chemist and druggist; and every person registered under this section who has gone into business as a principal between the passing of the principal Act and January 1, 1888, shall be placed on the Register of Druggists, and shall be styled a registered druggist.

7. *Apprentices and Assistants of Chemists and Druggists entitled to be Registered.*—Every person who shall have gone into business as a chemist and druggist, or chemist or druggist, as a principal, after January 1, 1888, and before the passing of this Act; or who shall have duly completed a term of service as apprentice or assistant of not less than four years to a person or persons who shall have become a registered druggist or chemist and druggist under this Act, or to a pharmaceutical chemist, shall be entitled to be registered as a druggist under this Act on complying with the following provisions:—

(1) He shall make application in writing to the Registrar to be registered under the provisions of this Act.

(2) Such application shall be accompanied by a statutory declaration of the applicant in the form

set out in Schedule A or B to this Act, with, in the case of assistants or apprentices, an additional declaration in the form set out in Schedule C.

(3) He shall be examined with respect to his knowledge of English orthography and composition, arithmetic, the appearance of the various drugs, and the usual tests for poisons in general use, and shall obtain from the Examiners appointed by the Council to hold such examination a certificate of having satisfactorily passed the same.

(4) He shall pay to the Treasurer of the Society on presenting himself for such examination a fee of two guineas, and a further fee of half a guinea on being registered.

Provided always that if he shall fail to satisfy the Examiner he may present himself for a second examination without further payment.

(5) Provided that a person who shall have duly completed a term of apprenticeship as aforesaid (commenced before the passing of this Act) to a person or persons who shall have become or who had he or they survived, or continued to carry on business, would have been entitled to become a registered druggist or chemist and druggist under this Act, shall be entitled to make application, and to present himself for examination and to be registered under this section.

Provided that evidence shall be adduced to the satisfaction of the Council that the applicant has completed a term of apprenticeship such as hereinbefore described; and provided also that if the term of apprenticeship be continued after the expiration of one year from the passing of this Act it shall not entitle the applicant to present himself for examination unless the term shall have been completed with a registered druggist or chemist and druggist.

(6) Provided always that a person who has prior to 1st January, 1888, served as an assistant or apprentice and assistant, for a full period of seven years to a druggist, or a chemist and druggist who has registered under this Act, or who, had he survived or continued in business, would have been entitled to register under this Act, shall be entitled to be registered as a registered druggist without examination on complying with the other provisions of this section.

8. *Examination of Intending Druggists.*—It shall be the duty of the Society to provide for examinations being held at which applicants for registration as registered druggists may present themselves for examination. Such examinations shall be held at not greater intervals than the examination of persons desirous of being registered as pharmaceutical chemists under the principal Act, and shall be held at Dublin and Belfast, and such other places as may be convenient,

Provided that it shall not be compulsory on the Society to cause any such examinations to be held outside Dublin unless at least twelve persons make application for examination thereat.

9. *Apprentices having passed Examinations, entitled to Registration.*—Every person who shall have served an apprenticeship of four years with a registered druggist, or a chemist and druggist, shall be entitled to present himself for examination under the principal Act and this Act, and shall be entitled on passing his examination to be registered as a druggist under this Act, and every person who shall have served such apprenticeship and who shall have passed the Preliminary examination of the Society and complied with other regulations at the time in force as to the examination of pharmaceutical chemists, and in addition shall have served an assistantship of *two** years to either a pharmaceutical chemist or a licentiate of the Apothecaries' Hall keeping open shop, shall be entitled to present himself for examination under the principal Act as a pharmaceutical chemist, and shall be entitled, on passing his examination, to be registered as a pharmaceutical chemist.

10. *Provisions of Principal Act as to Examinations, to extend to the Examinations authorized by this Act.*—The provisions of the principal Act with respect to the examination therein mentioned shall extend and apply to the examinations by this Act authorised, except so far as such provisions are altered by or are inconsistent with the provisions of this Act.

11. *Persons who may be elected Associates of the Pharmaceutical Society.*—Every person who shall be registered under this Act as a druggist, or chemist and druggist, shall be qualified to be elected an Associate of the Society, subject to any regulations made in pursuance of the principal Act and this Act, and every person so elected and continuing as such Associate, being in business as a principal, shall have the privilege of attending all meetings of the said Society and of voting thereat and otherwise taking part in the proceedings of such meetings in the same manner as members of the said Society. Provided always that such Associates contribute to the funds of said Society the same fees or subscriptions as members contribute for the time being under the regulations thereof.

12. *Representation of Registered Druggists, and Chemists and Druggists, on the Council of the Pharmaceutical Society.*—At a date to be fixed by the Council but not later than*

an election shall be held of seven persons (who shall be registered druggists, or chemists and druggists), to be members of the Council of the Society, and such election shall be held in like manner in all respects as an election of members of the Council of the Society in the place of retiring members held under the principal Act. Provided that the persons entitled to vote at the election of such seven members on the said Council shall be the persons who shall be then registered druggists, or chemists and druggists under this Act.

13. *Rotation of New Members of the Council.*—At the election held under the principal Act on the first Monday in October in the year the said seven members, as well as the members of the said Council, then retiring under the provisions of the said Act shall go out of office, and all the said fourteen members shall be eligible for re-election, but seven places only shall be supplied at that election by the members and associates of the Society, it being the intention of this enactment that the number of members of the said Council shall, after the said first Monday in October be 21, in accordance with the principal Act. Provided always that at every subsequent annual election registered druggists, and chemists and druggists, who are also associates of the Society, shall be eligible for election on the Council of the Society, but not more than seven of such registered druggists, or chemists and druggists, shall be members of the Council at the same time.

14. *Annual Fee to be paid by Registered Druggists not being an Associate of the Society.*—Every registered druggist who is in business on his own account, or is acting as manager in charge of any establishment open for the sale of poisons, who is not an elected associate of the Society contributing the prescribed subscription, shall, on or before the first day of December in every year, commencing with the year one thousand eight hundred and ninety, pay to the Treasurer a fee of ten shillings and sixpence, and unless such fee is paid on or before the date aforesaid, it shall be lawful to erase the name of such person from the register. Provided that the name shall be restored on payment of all fees which may be due and of such additional sum, not exceeding one guinea, as the Council shall direct.

* This is not conceded by the chemists and druggists, who think one year sufficient.

* Date in this section cannot yet be fixed.

15. *Annual Fee to be Paid by Pharmaceutical Chemist not being a Member of the Society.*—Every pharmaceutical chemist registered as such under the provisions of the principal Act after the passing of this Act, who is in business on his own account, or is acting as manager in charge of any establishment open for the sale of poisons and compounding of medical prescriptions, and is not a member of the Society, shall on or before the first day of December in every year pay to the Treasurer a fee of ten shillings and sixpence, and unless such fee is paid on or before the date aforesaid it shall be lawful to erase the name of such person from the register. Provided that the same shall be restored on payment of all fees which may be due and of such additional sum, not exceeding one guinea, as the Council shall direct.

16. *No Person to Assume Title of Registered Druggist, or Chemist and Druggist, or Sell Poisons, unless Registered.*—From and after the first day of January, one thousand eight hundred and ninety, it shall be unlawful for any person to assume or use the title of a registered druggist or registered chemist and druggist in any part of Ireland unless such person shall be registered as a druggist, or a chemist and druggist, under the Act, and notwithstanding the provisions of section 31 of the principal Act no person shall be entitled to sell or keep open shop for selling, retailing or compounding of poisons by reason that he was a chemist or druggist practising as such in Ireland on his own account at the time of the passing of the principal Act unless he shall be registered as a chemist and druggist under this Act, and any person acting in contravention of this enactment shall for every such offence be liable to pay a penalty of £5.

17. *Printed Copies of Registers to be sent to the Inspector of Weights and Measures, whos hall Report any Person infringing Act.*—In the month of January in each year the Registrar shall send printed copies of the Register of Pharmaceutical Chemists and of the Register of Druggists and of Chemists and Druggists to the inspector of weights and measures in each constabulary district in Ireland, and it shall be the duty of such inspector to report to the Council any offences against the provisions of the principal Act or this Act or the Act 33 and 34 Victoria, Chapter 26, entitled "An Act to regulate the sale of poisons in Ireland," committed within his district, and one-third of every sum of money recovered as a penalty against any person so offending shall be paid to any such inspector who shall be the means of bringing such person to justice.

18. *Shop for Sale of Poisons, or Compounding Medical Prescriptions, to be personally managed by Owner, or qualified Assistant.*—Any person or persons lawfully keeping open shop for selling, retailing or compounding poisons shall personally manage and conduct such shop and the retailing and compounding of poisons therein, or shall employ for the purposes aforesaid, as an assistant or manager in such shop, a duly registered druggist or chemist and druggist: and every person or persons lawfully keeping open shop for selling and retailing poisons, and dispensing and compounding medical prescriptions, shall personally manage and conduct such shop and the retailing, dispensing and compounding of poisons and medical prescriptions therein, or shall employ for the purposes aforesaid as assistant, or manager in such shop, a duly qualified pharmaceutical chemist, or licentiate apothecary, and any person or person or persons acting in contravention of this enactment, shall for every such offence be liable to pay a penalty of £5.

19. *Registrar may require Name of Proprietor of Premises where Poisons sold, or Medical Prescriptions Compounded, to be furnished to him.*—It shall be lawful for the Registrar at any time to write a letter addressed to the proprietor or proprietors, of any premises where open shop is kept for the selling, retailing, dispensing, or compounding of poisons or medical prescriptions (such letter to be delivered on the premises, or to be forwarded by post as a registered letter according to the post-office regulations for the time being in force), requiring such proprietor or proprietors, within seventeen days from the delivery of such letter, to furnish in writing to the Registrar a statement of the name and address of the *bona fide* proprietor or proprietors of such shop, and if such proprietor or proprietors do not personally manage and conduct such shop, the name of the duly qualified manager or assistant managing or conducting the same, and the description of his qualification, and in case such proprietor or proprietors neglect to furnish such information to the Registrar within the time aforesaid, he or they and each of them shall be liable to pay a penalty not exceeding one pound for every day during which such default shall continue, and so long as such default shall continue it shall be unlawful for any person to sell or retail, dispense or compound poisons or medical prescriptions on such premises. and every person or persons acting in contravention of this enactment shall for every such offence be liable to pay a penalty of five pounds, unless he or they shall prove to the satisfaction of the court or justices having jurisdiction in the case that he or they did not know of such default. Every person who shall make a false statement in writing with intent to mislead in reply to any inquiry addressed to him by the Registrar under this Act, shall be held to have made a false declaration, and shall be liable to the penalty provided under section 28 of the principal Act.

20. *Amendment of* 38 *and* 39 *Victoria, chap.* 57, *sec.* 11.—Section II. of the principal Act shall be read and have effect as if the words "the second monthly meeting" were substituted for the words "ten days" in that section.

21. *Application of Moneys Paid to Treasurer.*—All sums payable to the Treasurer under this Act shall be applied by him under the direction of the Council to the purposes of the principal Act and this Act.

22. *Penalties.*—All penalties recoverable under this Act shall be recoverable and applied in the same manner as penalties recoverable under the principal Act.

23. *Construction of Act.*—This Act and the principal Act shall be read together and construed as one Act.

SCHEDULES.

Schedule A.

Declaration by a person claiming registration as a chemist and druggist, or druggist in Ireland.

To the Registrar of the Pharmaceutical Society of Ireland.

I, , residing at , in the county of , hereby declare that I was in business as a chemist or druggist as a principal, keeping open shop for the sale of drugs, poisons, etc. (or that I was in business in the years) at in the county of , before January 1, 1888.

(Signed)

Dated this day of , 18 .

Schedule B.

Declaration to be signed by a person who is or has been apprentice or assistant to a registered chemist and druggist, or druggist.

To the Registrar of the Pharmaceutical Society of Ireland.

I, , residing at , in the county of , hereby declare that I have completed a full term of service as apprentice or assistant of years to , a registered chemist and druggist who has been duly registered

under "the Pharmacy Act (Ireland) 1875 Amendment Act, 1889."

(Signed)
Dated day of , 18 .

Schedule C.

Declaration to be signed by a registered druggist or chemist and druggist to whom an apprentice (or assistant) seeking registration has served as apprentice or assistant.

To the Registrar of the Pharmaceutical Society of Ireland.

I, , residing at , in the county of , hereby declare that has completed with me a full term of years as apprentice (or assistant), ending 18 .

(Signed)
Dated day of , 18 .

Supply of Laudanum by an Unqualified Person.

An inquest was held on Tuesday last at Ince, Lancs., to inquire into the death of a child named Hughes, aged 19 months. It appeared from the mother's evidence that she had been in the habit of administering to the child a mixture of laudanum, treacle, sugar and decoction of caraway seeds, and having to prepare a fresh supply she obtained a pennyworth of laudanum from a "patent medicine shop," no label being placed on the bottle. The laudanum was left in the bottle that usually contained the finished mixture, and a nurse not knowing this administered a dose of the unmixed laudanum with the result that the child died.

Emma Ashcroft said she resided in Manchester Road, Ince, and was a patent medicine vendor and drysalter. Mrs. Bibby, who formerly kept the shop, was her sister and her husband was a chemist and druggist. Dr. O'Donnell had a branch surgery in the shop. Witness had never acted as druggist. On Friday evening, as they were closing, a woman came and asked for some laudanum. Witness replied that she had none in the place, as she did not keep it, and asked her if it was for herself. She replied that it was, and never mentioned anything about a mixture or a child. Witness then said, "As it is for you, I might take a few drops out of the doctor's bottle." She gave her exactly ten drops. No money was mentioned, but a penny was found on the counter afterwards.

By the Inspector: She had access to the surgery in the doctor's absence. Mrs. Hughes got no laudanum from witness before, but did from her sister when the shop was carried on as a druggist's shop.

By Mr. Hopwood: She had no labels, as they would be of no use to her.

The Coroner in the course of his remarks to the jury said the law on the matter was simply that only qualified persons were allowed to sell to the public poisonous drugs, or to use the name of chemist and druggist. Only persons who knew what they were selling and what was its effect, what it was for and what it was not for, whom it was for and whom it was not for, and the quantities they ought or ought not to take, were allowed to deal in poisonous drugs. Poor people who were ignorant came and tried certain things, and unqualified persons gave them wrong medicines which they knew nothing about. Had Mrs. Hughes gone to a duly qualified chemist and druggist she would never have got the medicine for that purpose, because any chemist with common sense would refuse to sell a drug like that to a woman to give to a child. As the case stood a woman wanted some laudanum; she did not go to a regular chemist and druggist's shop for it, she went into what they were led to believe was a drysalter's shop. What was the shop? It was one which had been known in Ince for some years as a chemist's shop, and it was carried on originally by a man who was a qualified chemist and druggist. Then he died and the widow apparently kept the shop on with a duly qualified assistant. Afterwards the business was done away with, or it lapsed, or was transferred into the hands of Miss Ashcroft. There was no notice given, so far as he could judge, that it was not a chemist and druggist's shop, and people like Mrs. Hughes, who had probably lived in Ince for years, fancied it was still a chemist's shop. The name of Bibby was still over the door. Mrs. Hughes told them distinctly that for months, ever since the child was five months old, she had got the medicine at that shop, which she called Bibby's shop. She went into the shop and, according to her story, asked for a pennyworth of laudanum. He had not the slighest doubt that had Miss Ashcroft been a qualified person she would never have sold the laudanum for that particular purpose, and the child would have been living now. If there had been a "poison" label on the bottle Mrs. Kershaw would probably have noticed it and would not have administered the laudanum and the child would not have been poisoned. He hoped it would be a lesson to Miss Ashcroft that she would not in future, especially in a place like Ince, deal in drugs that the law distinctly said she had no right.

The jury returned a verdict of "Death through misadventure."

Obituary.

GEORGE OWEN REES, M.D., F.R.C.P., F.R.S.

We have to record the death at Mayfield, Watford, on the 27th of May, of Dr. George Owen Rees, formerly of Albemarle Street, London, Physician-Extraordinary to the Queen. He took his degree as M.D. in 1837, and as F.R.C.P. Lond., in 1844, and became Censor of his College in 1852, Senior Censor in 1863, and Member of the Council in 1855. He was Consulting Physician at Guy's Hospital, where he was formerly a lecturer on the Practice of Medicine. Dr. Rees was also an Honorary Member of the Pharmaceutical Society, having been elected in 1856.

GUSTAVE PLANTÉ.

The death is also announced, at Paris, of M. Gustave Planté, whose discovery a few years ago of the lead accumulator imparted such an impulse to the practical applications of electricity. M. Planté appears to have been in very precarious health for some time past, and had lived a very retired life.

Notice has also been received of the death of—

On the 26th of May, Mr. Francis Woolrich, Chemist and Druggist, York Road, Wandsworth. Aged 51 years. Mr. Woolrich was an Associate of the Pharmaceutical Society.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

The Council Election.

Sir,—Enclosed I beg to forward you a copy of my reply to some communications from your contemporary, the *Chemist and Druggist*, and as the subject possesses as much interest for the members of our Society who read our Journal as it does for the readers of the *Chemist and Druggist*, I shall be glad if you will insert it in your next issue.

I also enclose copies of some other correspondence which may be interesting.

Newcastle-on-Tyne. N. H. MARTIN.

[*Copy.*]

"29, Mosley Street, Newcastle-on-Tyne.

"*May* 27, 1889.

"Sir,—My time is usually very fully occupied, and it has been so much so during the current month that I have not replied to your communications of the 3rd and 4th inst. until to-day, and I should not now trouble you, had it not been that you appear disappointed at my reticence. As I have so rarely trespassed on your pages, I shall be glad if you will accord me space to give you my reasons for not responding to your invitations, and to make one or two comments upon events prominently alluded to in your Journal.

"I did not reply to your letter of the 3rd inst., asking me to advertise an election address in your pages, for two reasons. First, I doubted your assertion that your readers 'form the bulk of the electoral constituency,' and second, because I did not think that any formulation of my views, which could be published in the shape of an address, would be of the least value as a guide to my fellow members of the Society how to vote. On the question of elections generally, and the Pharmaceutical in particular, I happen to hold views somewhat at variance with the popular idea of which you claim to be the exponent. You appear to think that I am under some distinct obligation to those members of the Society who have by their votes recorded their conviction, that out of the choice they had the opportunity of making they have deemed me worthy to occupy a seat at the Council. On this point I join issue with you and all those who agree with you. I acknowledge the compliment to my comparative fitness for the post which has been paid to me, but with that acknowledgment all obligation on my part ceases; and there remain responsibility and the prospect of hard work which will absorb time, energy and money, which the members of the Society at large, and those especially who kindly voted for me, will be under an obligation to me for spending in their service.

"With regard to your circular letter of the 4th inst., neither of the two reasons put forward in your issue of May 11 is correct. I do not get my opinions 'ready formulated from the chair,' or from any other source, but bring such capacity and intelligence as I possess to the careful study of every question which comes before the Council, and I form my opinions for myself. You are in the habit of insulting Mr. Carteighe by describing him as an autocrat, and of taunting the members of the Council with being the 'valiant henchmen of the President.' I will not do you the injustice to suppose that you are so ignorant of the real facts of the case as this. You know perfectly well that as the President and mouthpiece of the Council, Mr. Carteighe may, and does often, put before the public the views of the majority of his colleagues, which may or may not previously have been his own views. I had the pleasure and honour of knowing Mr. Carteighe and his work for many years before I had a seat at the Council table; but I may tell you and all whom it concerns that my twelve months' work with him has greatly increased my respect for him. He has had his own views upon questions and been able to give reasons for them, but he has been as ready to receive education from his colleagues as to impart it, and whenever he has been convinced by the evidence and arguments of other members of Council he has been at all times the perfectly loyal exponent of those views. This is so true, that in some cases when a question has been debated for a long time in committee, in open Council our President is so loyal and so accurate in his setting forth the decision of his colleagues that it is often hardly necessary for one of them to make even a verbal correction.

"I do not hold the *Chemist and Druggist* in such 'excessive respect' that I feared to pen a reply to your queries lest my style should be unworthy of the 'brilliant literature' in your pages. I must confess to having a greater regard for truth than for merely brilliant writing.

"The real reason for my not replying is that my views and opinions upon hypothetical questions are of no value to the members of the Pharmaceutical Society, and upon practical questions I decline to be drawn into recording pledges on the one side or the other, until I have had every opportunity which my seat at the Council table gives me to fully inform myself upon the question, and as to the result, to exercise my deliberate and mature judgment according to my convictions. What is really interesting for the members to know, respecting me and every other candidate for the Council table, is, whether we are by education, training, experience, and command of our time, men who can and will perform our duties satisfactorily and bring a reasonable amount of common sense and sound judgment to bear upon the questions which come before us.

"My letter is growing longer than I intended, so I will only allude to one more topic, viz., your article on 'The Moral of the Election' in your issue of the 25th. Mr. Perry is not alone in his feeling of indignation at our President's position on the poll. Your article on this topic is as misleading as usual. No one, so far as I am aware, has ever called the twenty-eight members 'traitors because they gave an intelligible reason for voting,' but because those twenty-eight misguided and ignorant men lent their names to another society, and made use of the offices and funds of another society, to do that which they did not understand and could not manage themselves.

"I have had another reason given to me by a member to explain our President's position, and as it has not appeared in print perhaps you will allow me to record it, and that is 'that Mr. Carteighe has become so bumptious that it was felt necessary to give him a snub.' I do not know what the member meant by being 'bumptious,' but if it means what is so well expressed in your leader of the 18th inst., that 'Mr. Carteighe holds every string of the Pharmaceutical Society's work in his fingers, and knows intimately every detail of it; his antagonists seldom make the barest investigation into the facts and arguments which may be brought against them' (by him), then it would be a good thing if members of the Society at large (and I may include yourselves) would emulate their President's bumptiousness instead of indulging their petty jealousy at it. The fact is, Michael Carteighe is a pharmacist with ten talents, and it is not to be wondered at that the men of the one talent, which they have not cultivated, are envious of him. In the days of the parable, if there had been a popular election upon the 'one man one vote' principle, I think it is not difficult to conceive that the man who was justly condemned for not using his one talent would have indulged his spleen by crossing out the commended and rewarded possessor of the ten talents; although, by the use of his splendid gifts, the latter had shown himself to be the most capable citizen to be entrusted with public work. I am sorry there can possibly be so large a number as seven hundred members of our Society who have failed to use their one talent.

"Thanking you in anticipation for your fairness in allowing me the use of your columns for this reply,

"I am, Yours faithfully,

"N. H. MARTIN."

[*Copy of Circular Letter.*]

"Evesham (Worcester),

"May 7, 1889.

"Dear Sir,—While hoping there is no foundation in fact for the fears expressed by the Anti-Vivisection Society in connection with our new Research Laboratory, there are certainly not wanting some suspicious circumstances.

"A few years since some leading physiologist endeavoured to induce the Royal College of Surgeons to build a Research Laboratory avowedly for experimenting on living animals—in which they failed. Subsequently, several of these gentlemen associated themselves with the Pharmaceutical Society. Now we have built a Research Laboratory, with the work in which they are at least indirectly connected.

"Up to the present time there is no proof of any experiments on animals having been proposed or even suggested, but the assurance needed is that under no circumstances shall investigations so entirely outside the domain of legitimate pharmaceutical research be conducted on the Society's premises. Would you be entirely opposed to any such use being made of our new Research Laboratory?

"Yours sincerely,

(Signed) "JOHN H. PUMPHREY, Ph. C.

"Please say if I am to consider your reply as private."

[*Copy of Reply.*]

"Newcastle-on-Tyne,
"May 27, 1889.

"My dear Sir,—In so long delaying my reply to yours of the 7th inst., I have had (as I am sure you will know) no intention of being discourteous to you personally, but my daily correspondence and work are heavy, and circulars or circular letters either go direct into the waste paper basket or are put aside to wait a convenient opportunity for consideration, and reply if necessary. You may, perhaps, think that your query was of importance to me; as depending on my reply, you might or might not record your vote in my favour; but I was so completely indifferent as to the result of the election, in my own case, that I did not care to influence your vote in any way. Elected—means for me a considerable amount of responsibility and hard work; non-elected—would liberate me for pursuits which, to say the least, are quite as congenial.

"With regard to the subject of your inquiry, I am surprised that under the circumstances as you detail them you should ask from any man whom you judge to be capable of taking his share in conducting the business of the Society such a pledge as you request. I certainly should give no such undertaking in any case, but what I promise you is,—that when any proposition to experiment with drugs upon living animals in the Research Laboratory of the Pharmaceutical Society is made to the Council, I will, if I am then a member of that body, study the subject most carefully and vote conscientiously on it. That vote, when it is given, will be published, and perhaps my reasons for it, and the next time after that you have the opportunity you can give your vote for me or not, as you decide whether I have, in your judgment, done what was right or not.

"This is the attitude I assume towards every question, and I have never in my life tied myself with unnecessary and useless pledges, or given them in ignorance of all that can be said for or against any proposition. I am too old to alter now.

"As the question has been so prominently discussed, your circular and this reply possibly possess sufficient public interest to be published in the *Pharmaceutical Journal*, and I send them to the Editor for his decision on the point.

"I remain,
"Yours faithfully,
(Signed) "N. H. MARTIN."

[*Copy of Postcard.*]

"16 and 17, Cliffe, Lewes, Sussex.

"Sir,—Seeing how shamefully the Pharmaceutical Council has in the past neglected to 'protect' (see Charter) the interest of the trade, I am desirous, before voting, of knowing whether you are prepared to initiate or support measures calculated to do us some real good. I have seen the address of one candidate only, that of Mr. M. Leigh, Brighton. I quite agree with it. Can you endorse his programme? I think it is high time we gave up blind-voting, and we ought to know the views and intentions of those who seek our votes.

"We ought also to get much more for our £1 1s.

"Yours truly,
"W. T. MARTIN."

[*Copy of reply.*]

"Mosley Street, Newcastle-on-Tyne,
"*May* 27, 1889.

"My Dear Sir,—I duly received your postcard of May 9, and as it was quite immaterial to me whether I received your vote or not, I deliberately abstained from sending you my reply until now.

"I do not agree with you that the Pharmaceutical Council has 'shamefully neglected to protect the interests of the trade.'

"It is not necessary or even possible now to 'initiate measures calculated to do us some real good.' These measures were commenced in 1841, when the Pharmaceutical Society was founded, and to do the trade 'some real good' has been the endeavour of the Society from that day to this. The mass of chemists and druggists have refused or been incapable of understanding what was and is the 'good' they should seek.

"As Mr. Marshall Leigh has been elected on the Council, and will for the next twelve months be a colleague, you will perhaps excuse me for not expressing an opinion as to his address.

"I quite agree with you that 'blind-voting' should be given up. If it is practised, it is not only most undesirable, but it may be actually injurious to the best interests of the Society. There is, however, a very simple remedy in the hands of every member of the Society, and that is, to make a rule only to vote for those candidates about whose fitness to perform the duties of the Council he is assured, either from personal knowledge or from such reliable sources as may be available to him, if he will take the trouble to inquire. This will entail some little labour on the part of the member who wishes to vote, and it might be that in some cases only one or two candidates would receive the vote of some members; but better that than that any man should record his vote for an unsuitable person.

"I scarcely know what to reply to your assertion that 'we ought to get much more for our £1 1s.,' as our ideas must be widely different as to what is value for money. Speaking for myself, I have subscribed to the Pharmaceutical Society for twenty-five years and I am quite satisfied with the result of the outlay. It would seem to be an obvious truism that the members of any craft must, if they will, get full value for any reasonable subscription they may contribute to any organized Society capable of representing them, and that if the Society does not represent them, or they do not get full value, the fault will be their own.

"I think I have replied to your queries, as fully as you may desire, and as your communication was not private, I reserve the right to publish your card, and this reply if I deem it desirable.

"I remain, yours faithfully,
"Mr. W. T. Martin. "N. H. MARTIN."

THE COUNCIL ELECTION AND THE ANTI-VIVISECTION SOCIETY.

Sir,—I presume that I do not stand alone if, when individuals attempt to tamper with my rights and liberties, I wax indignant.

I need scarcely say that I refer to circular No. 1, emanating from the committee of the Anti-Vivisection Society, requesting me to vote for certain names, and none other. At this I was annoyed, and cast it aside as an impertinence.

But when I received a day or two since circular No. 2, "all jubilant" at the success (or fancied success) which this committee had achieved, and thanking me, amongst others, for the part I may have taken in bringing it about—it fairly "roused my monkey."

I have a thorough contempt for underhand dealing in any shape or form, and I must enter my most emphatic protest against the uncalled for and unjustifiable method which this committee has chosen to adopt, by interfering with the internal affairs of a Society with which they have neither interest or connection.

It is quite evident to me that the whole performance was a mere device, not instituted for the honour and good of the Pharmaceutical Society, but a mean attempt to get rid of its President; and I am surprised and sorry to find that any body of gentlemen could stoop to a trick so mean and contemptible. Instead of growing jubilant over the mischief and attempting to justify such an act, they might well bend their heads in shame for having been guilty of such meanness and folly.

Now, sir, I am not always in accord with the policy of the President and the Executive, but I would scorn such meanness as going out of my way to give to either an "ungenerous stab in the back," neither would I be guilty of setting up a "false issue" in order to attain my own ends. And I do consider that if the members of this anti-vivisection committee had wished well to the Pharmaceutical Society, and had been true to their own principles, they would have adopted a very different method, and that, by approaching the subject in a "fair" and legitimate manner.

I hope, sir, that in time to come, the whole body pharmaceutical will show this Committee that they are not again to be tricked or dictated to by an alien body.

False statements do often succeed for a time. They have done temporary mischief in this case, but in the end they defeat the object for which they were designed.

Brighton. G. G. HORNSBY.

The Council Election.

Sir,—I have just received a further communication signed "B. Bryan."

A secretary must, of course, do something to justify his postion, but I doubt if any of the Vice-Presidents of the Anti-Vivisection Society, men of high character, and incapable of mean acts, would approve the extraordinary excess of zeal shown by their employé. At all events, the facts of the case might be brought directly to their notice.

"You will have seen," says this precious epistle, "that the policy of the Committee of Chemists" (most of whom lacked the courage to face Mr. Carteighe at the Annual Meeting) "was perfectly successful in administering a caution to Mr. Carteighe, he, as President, having been placed last of those returned to the Council;" and in the letter to the editor of the *Pharmaceutical Journal*, which Mr. B. Bryan has now issued in the form of a circular, after imputing to Mr. Carteighe the base motive that he is using his position and office to obtain a Fellowship of the Royal Society, the claim is again put forward that Mr. Bryan's action "placed Mr. Carteighe at the bottom of the list of those returned."

But I wish to point out that Mr. Carteighe's was not the only name to be black-balled, two other gentlemen shared that honour with him, viz., Mr. Newsholme and Mr. Butt, and, as we may fairly presume, all who adopted Mr. Bryan's ticket (I will not say the Anti-Vivisection Society's) crossed out those three names, we are able, by comparing the election of 1887 with that of 1889, to estimate to what extent Mr. Bryan's action affected the 1889 election.

In 1887, 1623 voting papers were registered, Mr. Newsholme polling 1034 and Mr. Butt, 884. In 1889 1567 voting papers were registered, Mr. Newsholme polling 1051 and Mr. Butt 898; on a poll of 1623 these figures should have been 998 and 853 respectively. Messrs. Newsholme and Butt therefore improved their position by 53 and 45 votes. Mr. B. Bryant doubtless was perfectly aware of those figures and appreciated their significance, hence his non-allusion to these gentlemen in his circular. May we not, too, fairly assume Mr. Carteighe's vote likewise was favourably affected, and that Mr. Bryan's action actually secured his election, a result that all who take a practical interest in the well-being of the Society must be profoundly thankful for. Mr. Carteighe's position on the poll is easily explained, and a good many of us could enlighten Mr. Bryan on that point. One word more, and as I am personally unacquainted with Mr. Butt I can speak without fear or favour, but when he again solicits our suffrages I would advise every one to turn up the list of donations to the Benevolent Fund, where they will find substantial reasons for not crossing his name; reasons which may even outweigh those furnished by the pitch and toss method adopted by Mr. Bryan.

Denmark Hill, S. E. T. H. Powell.

Sir,—I for one was very pleased to see Mr. Giles's letter protesting against the interference of "an alien and irresponsible association," and, in the words of Mr. G. E. Perry, at Birmingham, it was "with feelings of indignation and shame" that I found our worthy President placed almost at the bottom of the poll. Surely members of the Society who had not hitherto been supporters of Mr. Carteighe (especially if they had been present at the annual meeting) could not have failed to have seen how thoroughly he then showed himself master of the Society's business in all its various and complex branches, and how evident it was that he devoted a very large amount of energy and time gratuitously to its service; and though I am not in any way personally acquainted with Mr. Carteighe, I feel sufficiently strongly in this matter to write and ask you, Sir, whether it would be too much to call a special general meeting to pass a vote of confidence in him as President, to apologize for the "unmerited affront" he has received, and to protest against the unwarranted interference of outsiders.

St. John's Wood. J. J. Chapman.

The Other Side of the Question.

Sir,—Mr. Giles states in last week's issue, Mr. Carteighe, the President, has been elected by the very bare majority of 59 votes, and Mr. Sandford, a former President, by a majority of 3 votes only, in a former election. In both instances, no mention is made of the position of the other candidates on the poll. Of the 4 new candidates 3 have been returned by very large majorities; whilst Mr. Carteighe received 231 votes less than in 1887. The records of the Journal also prove that the Council has not suffered so much defeat for very many years, and the interference of "fads" is believed to have had little or no weight on the vote. The President, the Council and Mr. Giles might as well recognize the facts at once, and also be prepared for further changes another year. No Council that conducts its business like a close corporation can long command the confidence of the trade or the esteem of the public. Geo. W. Sargent.

Something for the Pharmaceutical Society to do.

Sir,—The new Weights and Measures Bill requires that every weighing instrument shall be stamped by an Inspector. This will be a great inconvenience to everyone involved and no useful purpose will be accomplished, except the pecuniary advantage of the Inspectors. The principle of this clause is ridiculous, since neither the public nor the trader is necessarily protected thereby. The interests of the public should be adequately guarded by the uncertain visit of an Inspector and the infliction of a fine where incorrect scales or weights are discovered. If the clause cannot be struck out, I think chemists might reasonably claim exemption from its operation, since their special training renders them just as competent to correct their scales and weighing machines as an Inspector, and in the majority of instances probably more so. Moreover, their instruments need inspection in some cases every time they are used, and obviously this must be done by the chemist himself. I do not, of course, refer to exemption from penalty where incorrect scales or weights are found; indeed, I think that an erring chemist should be fined more heavily than any other trader.

I would suggest that a petition for exemption from the stamping clause be printed and a form sent to each of the local and divisional secretaries with a request that he should obtain if possible the signatures of all chemists in his district. A petition thus signed, submitted to the proper authorities by our worthy President, could not fail in its effect.

35, *Clifton Road, Maida Vale, W.* R. H. Parker.

The Position of Associates.

Sir,—Whilst agreeing that the granting of a diploma would strengthen the Society and its union with its members and associates, I cannot but express the opinion that the letter of J. W. T. Morrison, in the last number, is a curious one. Upon what grounds would he raise the "associates in business" to the position of "members," whilst leaving the "associates not in business" out in the cold? Have the "associates in business" anything to recommend them educationally to that position which the "associates not in business" do not possess? Surely history repeats itself, and in years to come a similar thing will possibly occur with the Pharmaceutical Society as recently took place between the fellows and members of the College of Surgeons. Looking at a body in a similar position to ourselves, *i.e.*, "The Incorporated Law Society," we find they are far too sensible to make a distinction without a difference between themselves, and I think our Society should be careful in this respect also.

Have fellows, members and associates if you will, but let them be graded educationally, *i.e.*, Honors or Major men=Fellows; Pass or Minor men=Members. Modified men might then be given the title of Associates.

I am a staunch supporter of the Society, and should be sorry to see it fall into error on this account.

Frederick Davis.

Erratum.—Test for Antipyrin.—In Mr. Stark's note upon this subject on p. 949 of last week's Journal there is a misprint of "potassium nitrate" for "potassium nitrite."

C. T. Cooper.—We know no work specially devoted to the subject, but some useful information will be found in the 'Art of Dispensing,' which is in the Society's Library.

Communications, Letters, etc., have been received from Messrs. Allen, Rentoul West, Ralling, Ignoramus.

"THE MONTH."

Jamaica Sarsaparilla.

The source of the Jamaica sarsaparilla of commerce imported from Costa Rica is given, both in 'Pharmacographia' and in Bentley and Trimen's 'Medicinal Plants,' as *Smilax officinalis*, H.B.K. Hanbury referred specimens collected in Bajorque and Patia, New Granada, and Chiriqui in Costa Rica, to the same plant, and remarked that the cinnamon brown sarsaparilla root grown in Jamaica for export to this country, in spite of its more amylaceous character, agrees in the leaves and square stems with the other specimens. Of Humboldt's type specimens there appear to exist only a few imperfect leaves in the National Herbarium of Paris, so that absolute identification could not be satisfactorily made. Accompanying these leaves, however, there is a portion of stem which in the tracing taken by Mr. Hanbury shows a terete and not a quadrangular section. The square-stemmed plant described by Hanbury ('Pharmacographia,' 1st ed., p. 640) as *S. officinalis*, H.B.K., has recently flowered in Kew Gardens, and Sir Joseph Hooker has consequently again sifted all the available information, and has arrived at the conclusion (*Bot. Magazine*, June, t. 7054) that the square-stemmed plant is not, as Hanbury supposed, identical with *S. officinalis*, H.B.K., and it is therefore described anew under the name of *Smilax ornata*, Hook. f. Although the plant has been twenty years in the Kew Gardens it has now flowered for the first time, and is the male plant, the female flowers being still unknown. The real difficulty which besets the identification of the botanical source of sarsaparilla is the dicœcious character of the plants, combined with the uncertainty how far the shape of the leaf and the angular or terete character of the stem are constant throughout the plant. Sir Joseph Hooker is inclined to consider his *S. ornata* the same plant as that described as "*S. ornata*?, Lemaire," in the 'Illustrations Horticoles;' but in the Kew plant he does not find the large deltoid amplexicaul stipules, and the leaf-base rarely, in a young state, cuneate. Until female and male flowers of the plants yielding the various commercial sarsaparillas can be obtained, the new name *S. ornata* Hook. f. must evidently be accepted as that of the plant yielding the official sarsaparilla, since Sir Joseph Hooker is disposed to think, from the evidence before him, that the cultivated Jamaica sarsaparilla (*S. officinalis*, H.B.K.) and *S. ornata*, Hook. f., will prove to be distinct species. The only possibility of throwing further light on the subject lies in the microscopical examination of sections of different parts of the stems and roots of the respective plants. It may be hoped that in these days of rapid and easy travelling the attention of explorers in Central America will be directed to these commercially important plants and that our National Herbaria may not long remain without flowering specimens of them.

Mandragora Alkaloids.

Some of the uncertainty that has hitherto existed as to the active principles of mandragora root, appears to have been cleared up by a recent investigation by Herr Ahrens, who reports that he has separated two basic substances that are probably isomers of hyoscyamine (*Annalen*, ccli., 312). The residue from the evaporation of an alcoholic extract of the roots was treated with acidulated water, the solution heated with potassium carbonate in excess and then shaken with ether and the ether evaporated, when a deliquescent alkaloidal substance was left, which when dried over sulphuric acid resembled a brittle resin. When neutralized with sulphuric acid it formed a sulphate crystallizing in white scales, a solution of which dropped into the eye dilated the pupil. Analysis of the gold salt gave results pointing to the formula $C_{17}H_{23}NO_3 \cdot HCl \cdot AuCl$, or the same as that of hyoscyamine, atropine and hyoscine. But although the gold salt had much of the external appearance of hyoscyamine gold salt, and a melting point only six or eight degrees lower, the properties of the other salts studied differed widely from the corresponding salts of hyoscyamine, and moreover the new substance was not converted into atropine by prolonged contact with alkaline liquor. Herr Ahrens is therefore convinced that the substance is a new isomer of the belladonna alkaloids and has named it "mandragorine." The press residue left after the extraction with alcohol was then treated with acidulated water and the aqueous solution supersaturated with potassium carbonate was shaken with ether, which left on evaporation an oily base that did not crystallize over sulphuric acid. A solution of the sulphate of this substance, which could not be obtained crystalline, when applied to the eye also dilated the pupil. The mercuric chloride, platinochloride and gold double salts were obtained crystalline; but the quantity available was too small to allow of the determination of its composition, although Herr Ahrens thinks it is probably another isomer of the belladonna alkaloid.

Cupreine.

Cupreine, the characteristic alkaloid of the bark of *Remijia pedunculata*, has been the subject of a thorough investigation by Dr. A. Oudemans, junr. (*Chem. Zeit., Rep.*, May 11, p. 143), who confirms generally the statements made respecting the alkaloid by Dr. Hesse. The composition of the alkaloid crystallized from ether and dried at 130° C. is given as $C_{19}H_{22}N_2O_2$, and when separated from an alcoholic solution by water and dried in air as $3C_{19}H_{22}N_2O_2 + H_2O$. Cupreine behaves as a diacid base and gives with most acids two series of salts, which Dr. Oudemans distinguishes as "basic" and "neutral." With some acids, as for instance, sulphuric acid, the alkaloid forms still another salt, containing double as much acid as the neutral salt, which is therefore considered an "acid" salt. The neutral and acid salts are as a rule pretty freely soluble in water, but the basic salts are less soluble in water, and the aqueous solutions are usually yellow, though the same basic salts give with absolute alcohol perfectly colourless solutions. The colourless solutions of neutral salts are not however coloured by a certain quantity of basic salt which results from dilution and decomposition. The rotatory power of free anhydrous cupreine in 97 per cent. alcohol is given as $[\alpha]_D = -175{\cdot}3°$.

Constitution of Morphine.

Whilst studying the products of decomposition obtained by the treatment of morphine with alcohloic potash, Professor Skraup has determined the presence amongst them of methylethylamine, the hitherto unknown fourth amine of the composition $C_3H_9N_6$ (*Monatshefte*, x., 101). The compound was obtained as a clear liquid, having an intense amine odour, but unlike that of trimethylamine, and as the properties of its

salts precluded the idea of it being either propylamine or isopropylamine, it was supposed to be the missing isomer. This was confirmed by preparing methylethylamine synthetically by heating methyl iodide with a mixture of commercial 30 per cent. ethylamine solution and ethylic alcohol, the separated base agreeing in its own properties and that of its salts in every respect with the morphine decomposition product. The same compound was obtained upon treating codeine with alcoholic potash. It is considered that this observation is in accord with the theory that morphine, $C_{17}H_{19}NO_3$ is a derivative of phenanthrene, $C_{14}H_{10}$, and that it is positive evidence that morphine contains an ethyl as well as a methyl group, and that both are probably combined with the nitrogen. Since the appearance of the foregoing, a communication has been made to the German Chemical Society (*Berichte*, xxi., 1113), by Dr. Knorr, stating that he has observed oxyethyldimethylamine among the decomposition products of methylmorphimethin, and he draws therefrom some important conclusions as to the constitution of morphine.

Caffeine Oxalate.

In a paper recently communicated to the Vienna Academy of Sciences (*Chem. Zeit.*, April 17, p. 494) Dr. Leipen states that the compound of caffeine with oxalic acid differs from other known caffeine salts in not being decomposed by water. It is, on the contrary, a very stable salt, which is not decomposed by repeated recrystallization.

Nicotine Tartrate.

The salts of nicotine hitherto known are difficult to crystallize and to obtain in a satisfactory condition. But according to Herr Dresser (*Archiv*, March 31, p. 266), the acid tartrate forms an exception, and can be obtained as a well crystallized and definite salt. He prepares it by adding to pure nicotine a hot concentrated filtered alcoholic solution of tartaric acid, when the acid tartrate separates as a white syrup. After cooling, more of the tartaric acid solution is added, as long as it continues to produce a milky separation, and then the last trace of the salt remaining dissolved in the alcoholic liquor is precipitated by the addition of ether. The precipitate is dissolved in hot alcohol, the solution filtered and ether added to promote the separation of the salt, when it is obtained in handsome crystalline tufts. Analysis of the salt indicated the formula $C_{10}H_{14}N_2(C_4H_6H_6)_2+2H_2O$; it therefore contains 32 per cent. of nicotine.

Nicotinic Acid.

Some months since M. de Coninck made the interesting observation that in the oxidation of a ptomaine having the formula $C_8H_{11}N$ by means of a solution of potassium permanganate a pyridincarboxylic acid was obtained presenting the principal characters of nicotinic acid. Having since obtained the compound in a purer condition he is able now to state definitely (*Compt. Rend.*, cviii., 809) that this acid produced in the oxidation of a ptomaine is identical with nicotinic acid resulting from the oxidation of nicotine.

Castoreum.

A few years since the late Dr. Klunge reported that in varieties of castoreum giving a watery extract that had an acid reaction he had found an alkaloidal substance which reduced potassium ferricyanide and was therefore thought to be a ptomaine. Since that time, however, this reaction has been ascertained not to be peculiar to ptomaines, but to take place also with several plant alkaloids and even with some glucosides. The investigation has therefore been taken up again by Herr Reuter (*Pharm. Centralh.*, May 16, p. 305) who has obtained a crystalline substance, soluble in water, a solution of which gives reactions similar to those of an alkaloid with several reagents and when heated with an addition of dilute hydrochloric acid reduces Fehling's solution freely. Herr Reuter appears in fact doubtful at present whether he has to do with a homogeneous body or a mixture of a glucoside with an alkaloid, and purposes continuing his investigation with a view of clearing up this point.

Fumarine and Corydaline.

The common fumitory (*Fumaria officinalis*) formerly had a reputation in this country as a tonic and diaphoretic and is still used on the continent as an antiscorbutic, but although its active principle has been stated to be an alkaloid, fumarine, the compound has been but little studied. By some chemists it has been represented as being identical with corydaline, an alkaloid separated from plants of the nearly allied genus *Corydala*, but this seems to be disproved by a recent investigation by Herr Reichwald (*Pharm. Zeit. Russl.*, March and April). According to this author fumarine has a composition represented by the formula $C_{21}H_{19}NO_4$, and can be obtained in colourless crystals, freely soluble in chloroform, less soluble in benzol, still less soluble in alcohol and ether, and sparingly soluble in water. When placed upon the tongue fumarine is tasteless, but a solution in acidulated water has a bitter taste. It is inactive towards polarized light. On the other hand, crystalline corydaline, prepared from *Corydalis cava*, has a composition represented by the formula $C_{20}H_{19}NO_2$. Among other points of difference between the two alkaloids fumarine is described as giving with concentrated sulphuric acid immediately an intense violet colour, whilst corydaline remains colourless for several hours, and then only becomes pale violet. Corydaline treated with strong nitric acid takes at once an intense golden-yellow colour, whilst fumarine is only faintly yellow, becoming darker after a time. The yield of fumarine was only equal to 0·04 per cent. of the dried herb used.

Gratiolin.

Another herb that formerly had a high reputation in popular medicine is the "hedge hyssop" (*Gratiola officinalis*). The active principle of this plant is said to be "gratiolin," one of two glucosides occurring in it, the other being named "gratiosolin." Under the name "gratiolin" a compound is included in Merck's 'Bulletin' which is described as occurring in lustrous brown scales, of bitter taste, easily soluble in water and somewhat less readily in alcohol. At present the therapeutic action of this compound has not been determined, but as the plant itself is capable of acting somewhat violently as a drastic purgative and emetic, and it is suggested that gratiolin possesses like properties in an intensified degree, some caution will be desirable in carrying out any preliminary experiments.

Borates of Alkaloids.

The acidity of certain alkaloidal salts is occasionally a source of inconvenience, as for instance, when used in ophthalmic practice. The difficulty is sometimes overcome by the addition of a small quantity of the free base, but M. Petit suggests that a better

plan would be to use the compounds of the alkaloids with boric acid (*Répertoire*, May 10, p. 215). Even the biborates are still distinctly alkaline, and the small quantity of boric acid set free in consequence of decomposition, as is the case with atropine and its isomers and cocaine, would always be more than saturated by this excess of alkalinity. The method proposed by M. Petit is to dissolve one part by weight of the alkaloid (eserine, pilocarpine, atropine, hyoscyamine, or cocaine) in a small quantity of alcohol, then two parts by weight of boric acid in another quantity of alcohol; mix the two solutions and evaporate to dryness. The product contains one-third of its weight of alkaloid, and is said to be very soluble in water, the solution being always sufficiently alkaline to avoid causing irritation.

Papier Iodogène.

In a communication addressed to the Société des Pharmaciens de la Côte d'Or (*Répertoire*, May 10, p. 207), M. Eymonnet suggests the use, in the place of iodized cotton or applications of tincture of iodine, of a preparation that he calls "papier iodogène," which when moistened with water disengages iodine in the nascent state. The "papier" consists of one sheet of paper impregnated with a mixture of potassium iodate and tartaric acid, and dried, and another steeped in solution of potassium iodide and dried. Between these two a thin sheet of paper is placed, and the three are stuck together. When required for use the "papier" is moistened and applied with a covering of sheet gutta percha. The tartaric acid attacks the potassium iodide, liberating hydriodic acid, and this reacts with the iodic acid from the iodate, setting free the iodine. The reaction is said to go on without elevation of temperature, the sensation of warmth experienced being due to the revulsion set up by the nascent iodine. This gradually becomes more accentuated, but is tolerable for the forty-five minutes during which the reaction lasts, by which time the originally blackened paper has become a straw yellow tint.

Kreosote as an Antipyretic.

Hypodermic injections of kreosote are reported on favourably by Dr. Scheteles for the reduction of high temperature (*Pharm. Post.*, May 26, p. 354). Almond oil is used as a vehicle, a solution being made of the strength of 20 to 30 per cent. The injection is said to be always followed by a fall of temperature in proportion to the amount of fever existing in the patient, and the injection of 1 to 1·50 gram of the solution is reported to have been repeated daily for months without disturbance of digestion or other unfavourable symptoms. The taste of the kreosote is said to become perceptible in the mouth a quarter of an hour after an injection had been made. Dr. Scheteles adds that guaiacol possesses the same property in a much higher degree, so that it is only necessary to use one-third or one-fourth as much guaiacol as kreosote to produce equal effects.

Foreign Chloroform.

According to an investigation lately carried out by Professor Mentin, the newly-appointed Professor of Pharmacy and Pharmacognosis in Warsaw, chloroform is very frequently impure. For example, one specimen, obtained from a well-known Saxon house and labelled "chloroformum purissimum," when 49 c.c. were evaporated gave a residue weighing 0·0006 gram, consisting of fine large white needle-like crystals of disagreeable smell, reminding one of rancid butter, insoluble in water, and darkened by hot sulphuric acid. Another sample, which is stated to have been manufactured from chloral, left a residue weighing 0·0011 gram, consisting partly of oily matter and partly of crystals, having a sweetish aromatic odour of a disagreeable nature if inhaled for any time and tending to cause stupor. The worst specimen, however, was one also obtained from a respectable German house. Of this 49 c.c. were taken and subjected to fractional distillation; "6·5 c.c. came over at 59° to 60° C., 30 c.c. from 60° to 61°, and 12·5 c.c. above 61°. The first 5 c.c. was turbid from the admixture of water. The residue weighed 0·0022 gram and consisted of well-defined acicular crystals surrounded by a yellowish liquid. It had a most disagreeable odour of nitrobenzol mingled with tobacco, which when inhaled produced giddiness and headache. After forty-eight hours the smell of nitrobenzol passed off and was replaced by that of benzoic acid. When the residue was heated on a watch glass it partly evaporated, the remainder turning brown and emitting a smell like that of burnt indiarubber." It is not very wonderful that the surgeons who used this last sample for operating purposes found alarming symptoms arise in fully one-half of the cases. Professor Mentin says that none of the specimens came up to the standard of the Russian Pharmacopœia, which does not differ much from that of the German Pharmacopœia. It is interesting and gratifying to note that the sample which most nearly approached the standard was one manufactured in this country. The German specimens were mostly produced by the alcohol and bleaching powder process.

Solubility of White Precipitate.

Mr. G. Stillingfleet Johnson records the observation (*Chem. News*, May 17, p. 234) that ammonium carbonate is far more powerful than ammonium chloride in preventing the precipitation of mercuric chloride from solution by ammonia. Not only does the presence of carbonate in ammonia water cause the re-dissolution of white precipitate as fast as it is formed upon the addition of small quantities of mercuric chloride; but even after the complete precipitation of a solution of mercuric chloride by ammonia water the addition of ammonium carbonate causes the precipitate to redissolve.

Ammonia as an Antiseptic.

Some years ago Dr. B. W. Richardson, in a communication to the Medical Society, called attention to the antiputrescent properties of ammonia, and showed that blood, milk, and other alterable liquids could be preserved for a long time by adding to them certain quantities of solution of ammonia, and solid substances, such as flesh, by keeping them in closed vessels filled with ammonia gas. Some doubts that would appear to have been raised as to the results reported, on the ground that ammonia was itself a product of decomposition, induced Dr. Gottbrecht, of the University of Greisswald, to repeat the experiments, with the result of practically confirming all Dr. Richardson's statements (*Arch. exp. Path. u. Pharm.*, April, p. 385). After some preliminary experiments, in which animal matter placed in 5 per cent. ammonia solution was found free from putrescence after nearly two years, ammonium carbonate was used in the place of the free alkali for the sake of convenience. The first experiment, made with the washed intes-

tines of freshly-killed pigs, showed the power of ammonium carbonate to retard putrefaction to be directly dependent upon the concentration of the solution, a 1 per cent. solution retarding it until the third day, and a 10 per cent. solution until about the sixtieth day. When added to gelatin in which putrefaction had already been set up by inoculation it was found that a 5 per cent. solution so modified the conditions that the putrescence ceased, and a 2½ per cent. solution inhibited the development of bacteria, so that the liquefaction of the gelatin was practically stopped. Other experiments showed that in an atmosphere impregnated with ammonium carbonate meat could be kept for six months, and at the end of that time remain nearly unaltered. Dr. Gottbrecht also discusses the conditions under which products of putrefaction may act prejudically to the originators of the putrefaction. This he believes to be due to a toxic action dependent on the degree of concentration. He points out that cadaverine, a product of decomposition of a cadaver, in certain degrees of concentration acts as a direct poison upon the abcess coccus, and he concludes that, similarly, all products of tissue change in living organisms can become noxious to their originators as soon as their quantity exceeds a certain limit.

Bacteria Ferment.

In a communication to the Royal Society Dr. T. Lauder and Dr. Macfayden give some important information as to the ferment action of bacteria (*Nature*, May 2, p. 21). The object of the investigation was to ascertain whether microbes act on the soil upon which they grow by means of a ferment, and if so, whether the ferment could be isolated and its action demonstrated apart from the microbes that produce it, similarly as the ferments of the stomach and pancreas can be obtained apart from the cells by which they have been secreted. The microbes used were Koch's spirillum, Finkler's spirillum, a putrefactive micrococcus, scurf bacillus and Welford milk bacillus. The putrefactive bacillus gave negative results, but the conclusions drawn from the experience with the other organisms was as follows. It was found that the bacteria which liquefy gelatin do so by means of an enzyme that can be isolated so as to allow of its independent peptonizing action being demonstrated. This enzyme is most active when formed in meat broth, but its activity is hindered by acidity and favoured by alkalinity. The same bacteria, when cultivated upon carbohydrate soil can produce a diastatic enzyme that can also be isolated. This diastatic enzyme, however, has no effect upon gelatin, and, on the other hand, the peptonizing enzyme produced on gelatin exercises no diastatic action. So that it would appear that these microbes can, for the purposes of nutrition, develop a ferment adapted to the soil in which they grow.

Ozone and Guaiacum.

The interesting observation is recorded by Herr Kowalewsky that although ozone is capable of giving with guaiacum resin a whole series of coloured oxidation products, the intervention of moisture is necessary for this result (*Chem. Zeit.*, *Rep.*, May 4, p. 131). Paper that has been saturated with tincture of guaiacum and then perfectly dried is not coloured by ozone whilst it remains dry, but if a part be moistened with distilled water it becomes coloured at that spot. It would appear, therefore, that the ozone is capable of oxidizing the finely divided resin only in the presence of water, though what part the water plays it is at present difficult to say. If perfectly dry guaiacum paper be subjected for one or two minutes to the action of ozone and then moistened it is coloured blue and this property is retained for a quarter of an hour or more. Distilled water through which ozone has been passed during some hours behaves perfectly indifferently towards guaiacum paper. Iodine behaves quite similarly to ozone. If a piece of iodine be laid upon moist guaiacum paper a blue ring is formed at the spot, and this reaction is intensified by the addition of more water to the iodine, but if the guaiacum paper be dry no such reaction takes place. If the guaiacum paper be moistened only with turpentine the iodine causes no coloration, but there is a formation of a cloud similarly as when a piece of iodine is held over a drop of old turpentine.

Gluten in Wheat.

It is known that different varieties of wheat vary very much in respect to the quantity of gluten they contain, and that it is the practice for certain purposes to blend the flour from "soft" or amylaceous wheat with that from the so-called "hard" wheat. Some interesting experiments reported on by Messrs. Gatellier and L'Hote (*Compt. Rend.* cviii. 859) had for their object to ascertain the conditions which would affect the proportion of gluten in any one variety of wheat. The first series, made in 1882, related to the effect of a previous crop. White Victoria wheat was grown in the same sandy soil, having a subsoil of gravel, with the same complementary manuring, (1) after sugar-beet; (2) after oats, preceded by a clearing of lucerne; (3) after a crop of black medick and use of stable manure. The wheats obtained were quite different from each other in appearance, the finest looking being that grown after beet, but this was no indication of its richness in gluten. By a determination of the nitrogen and multiplying the result by the co-efficient, 6·25, for gluten, it was estimated that the proportion of gluten was in No. 1, 9·06 per cent.; No. 2, 10·06 per cent.; and No. 3, 10·50 per cent. The explanation appeared to be that beet is a crop that greatly impoverishes the soil of nitrogen, whilst under the other two conditions more nitrogen is left in the soil, and therefore in the next experiments manures were used consisting of sulphate of ammonia and superphosphate in different proportions. It was found that it was possible to augment, within certain limits, the richness of the grain in gluten by cultivation, and that the highest amount, 12·75 per cent., was obtained when sulphate of ammonia and superphosphate were used in equal quantities, or, in other words, when the ratio between the nitrogen and the phosphoric acid in the manure was 12 : 9.

Isoarabin.

In an attempt to reproduce the conditions under which plant acids are supposed to be reduced by the action of chlorophyll, Professor Balls has obtained a carbohydrate closely resembling the arabin of gum arabic, and having the same composition $C_6H_{10}O_5$ (*Nature*, April 25, p. 613). Equal quantities of tartaric acid and ferrous sulphate, the latter representing the iron in chlorophyll, were dissolved in the smallest possible quantity of water, and heated on a water-bath and eventually evaporated to dryness. The residue was neutralized with milk of lime, filtered, and the

solution again evaporated on a water-bath, a viscid, sticky syrup being formed, which upon cooling yielded a crystalline calcium compound represented by the formula $(C_6H_9O_5)_2Ca+9H_2O$. The carbohydrate, which has been named isoarabin, was separated from this compound as a nearly colourless syrup, readily mixing with water, not reducing Fehling's solution, dextrorotatory, and behaving like the carbohydrates of the $C_6H_{10}O_5$ group.

Chirkhest and Bidenguébin.

M. Raby gives an account of two varieties of manna collected in Persia upon willows (*saules*), and said to be used under the above name as laxatives (*Union Pharm.*, May, p. 201). M. Raby claims that the results of his examination shows the chirkhest to differ from numerous analogous exudations already studied by Ludwig. He finds it to contain about 8·3 per cent. of glucose, 4·1 per cent. of cane sugar, or an analogous sucrose, and about 50 per cent. of a new sugar, which he proposes to call chirkheshtite. He separated it by removing the glucose and sucrose by fermentation with beer yeast. Chirkhestite has a composition represented by the formula $C_6H_{14}O_6$ and appears to belong to the mannite group; it is nearly related to sorbite, sorbite melting a little below 100° C. and chirkhestite at 112° C. Sorbite does not affect polarised light, but chirkhestite does, although it appears doubtful whether or no this action is due to impurities. Chirkhestite dissolves in less than half its weight of cold water. There seems to be some mistake about the origin of the chirkhest, which is probably identical with the shirkhist described in 'Pharmacographia,' and which Haussknecht affirms is derived from *Cotoneaster Nummularia*. This source has been since confirmed by Dr. J. E. Aitchison, who brought both the manna and the plant yielding it back from Afghanistan. The relationship of chirkeshtite to sorbite would thus become more clear, since cotoneaster and the tree yielding sorbite, *Pyrus Aucuparia*, both belong to the pomiferous section of *Rosaceæ*. M. Raby gives an illustration of the crystals formed by the action of nitric acid on the new sugar, and of the crystals of bedenguebinose, which may prove useful for future reference to students of the group of sugars, a group which at the present time seems to be receiving a considerable amount of attention. The second variety of manna, bidenguébine, is said to be also derived from the leaves and young branches of a willow, and to have a feebly saccharine taste. It affords about 12 per cent. of sugar, estimated as glucose, and a considerable quantity of a sugar crystallizing in opaque hard crystals like those of sugar of milk. It melts at 150° to a transparent liquid and dissolves in 5·5 parts of water at 15° C. The formula is given as $C_{12}H_{22}O_{11}$. This sugar evidently possesses considerable affinity to melezitose, from which it differs, according to M. Raby, in not being efflorescent, and in the greater rotatory power of the glucose derived from it by inversion over that obtained from melezitose. The inversion by means of dilute hydrochloric acid also takes place more rapidly. He therefore proposes to call the new sugar "bidenguebinose." The similarity in name of this manna, as well as in its composition, to the alhagi manna or tur-anjabin (the product of *Alhagi Camelorum*, Fisch.), is remarkable. Villiers showed that manna to contain cane sugar, a dextro-gyrate glucose and melezitose.

In the *Botanical Magazine* for May an illustration is given of a small tree or shrub, known in Queensland as the poison tree. It belongs to the nettle family, and from the singular resemblance of its fruit to the mulberry, it has received its specific name. Like its Indian relative, *L. gigas*, it is clothed with virulently stinging hairs, which are stated to have so powerful an effect as even to cause the death of horses. It is enumerated by Bailey and Gordon in their work on 'Plants Reputed Injurious to Stock.' At Kew, where the plant has flowered in July, it attains only the height of two feet. The upper panicles were all female and the lower male, and the fruit remained in a plump condition for nearly a year. The female flower has four sepals, of which the two outer ones are very small and the two upper enlarge in fruit, becoming fleshy, purple and shiny, almost concealing the small achene. The chemical nature of so virulent a poison seems worthy of investigation, if only to find some remedy capable of allaying the irritation caused by the stings of the plant.

Laportea moroides.

In the *Gardeners' Chronicle* (May 18, p. 620) several varieties of the cherry-laurel are figured, which differ considerably in the form of their leaves. Of these the var. *Caucasica*, which has oblong lanceolate leaves of a dark green colour and has a pyramidal and compact habit, is the more hardy, and owing to the amount of chlorophyll it contains is better adapted for shady situations. The var. *Colchica* has leaves of somewhat thinner texture, paler green colour, and with the greatest diameter above the middle of the leaf. Attention may here be recalled to the fact that Perinelle (*Pharm. Journ.*, [3], xviii., p. 170) believes the var. *Caucasica* to be the best for medicinal purposes, the leaves containing more volatile oil and being of more robust growth.

Prunus Laurocerasus.

Under the heading of "Persian Zalil" attention is directed in the 'Kew Bulletin' for May to the flowers of *Delphinium Zazil*, as one of the most interesting discoveries of economic value resulting from the work of the Afghan Delimitation Commission. Dr. Aitchison states that the flowers are collected largely for exportation for dyeing silk, and that they find their way through Afghanistan to Northern India to be employed as a dye as well as used as a medicine. Sir J. D. Hooker remarks that the fact of *D. Zalil* affording a dye-stuff is one of the many evidences of our ignorance of the materials used in the industrial arts of the east, and that he is unable to find any allusion to the subject of zalil in books devoted to the economic botany of India or its manufactures. There seems good reason to suppose, nevertheless, that the yellow zarir flowers described in Dymock's 'Materia Medica of Western India,' and referred in that work to *D. saniculæfolium*, are identical with zalil, one of the Bombay names of the drug being gul-jalil, *i.e.*, zalil or jalil flowers. Dymock remarks that "the drug contains much colouring matter, probably berberine; no complete examination has been made." A specimen in the Museum of the Pharmaceutical Society and received from the late India Museum under the name of sukhai is obviously the same drug as zalil, having the smooth flowers, pedicels pubescent in front and ribbed follicles of *D. Zalil*.

Delphinium Zazil.

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The Pharmaceutical Journal.

SATURDAY, JUNE 8, 1889.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

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THE COUNCIL MEETING.

As is usual, the first meeting of the newly constituted Council, last Wednesday, was chiefly taken up with the election of officers for the ensuing year, and members of the Society may be congratulated that the first step in the proceedings was an emphatic condemnation of the attempt that has been made, in a decidedly underhand and irregular manner, to deprive them of a President who has so thoroughly sustained the reputation of his most eminent predecessors for devotion to the advancement of their interests. We will not venture to speak of the probably mere personal antagonism underlying that attempt, or the mean device to which recourse has been had, it is sufficient that it has been defeated and that the Society has escaped from what would have been at this moment a misfortune. Of course Mr. CARTEIGHE cannot always continue to be President of the Society, but whenever he retires from the duties attaching to that office his past services alone will be sufficient to command for him the warmest gratitude and respect of every one of the Society's members. The re-election of Mr. BOTTLE, as Vice-President, is equally a matter for satisfaction. He will be welcomed no less as a father of the Society than as a vigorous guardian of the interests of his craft. As Treasurer Mr. ROBBINS has been so long in charge of the Society's monetary affairs, and has in various ways proved so useful in that capacity, as scarcely to admit of the possibility of being replaced at the present time, and though his modesty has induced him to announce that this is the last time he desires to serve, it may be hoped he will, nevertheless, be induced to change his mind at the end of the coming year.

The retirement of Mr. SAVAGE from the Council naturally gave occasion for the expression of regret on the part of his colleagues, as well as appreciation of the valuable services he has rendered during the twenty-eight years he has occupied the position of member of the Council. We heartily endorse the good wishes, expressed in the resolution that was passed, for his future enjoyment of health and ability to continue his active interest in pharmaceutical affairs. While speaking of this loss to the Council and to the Society we may also venture to express regret at the non-election of Mr. BUTT. That appears to be a distinct loss to his former colleagues, as well as a loss of executive capacity for the Society, and we feel sure that many of our readers will share that opinion. The acquiescence of the Council in Mr. PLOWMAN'S application to be restored to the register of pharmaceutical chemists will afford pleasure to his numerous immediate friends, who look forward with interest to the new career he is about to enter upon in connection with the College of Pharmacy of Melbourne. His temporary severance from the Society, in consequence of having been engaged in medical practice, was no doubt a source of regret to many, but in view of the desirability of establishing a definite line of demarcation between medicine and pharmacy it may be doubted whether the regulation which requires such a severance under certain conditions is one to be lamented otherwise than in regard to personal relations.

The motion to refer the nomination of local secretaries of the Society to the consideration of a committee brought under notice a matter that should receive attention not only from the Executive body but also from the members at large. It is remarkable that in a Society so democratic in constitution as the Pharmaceutical Society unquestionably is, there should be seen at one and the same time a profession of disapproval of the policy and action of the Executive body, and also an abstention from the exercise of those powers of self-government which are at the command of every member. So glaring is this anomaly that it is scarcely possible to avoid the suspicion that the complaints we often hear are either merely sentimental or directed to some matter that is beyond the power of the Society or its Executive to provide a remedy for. But, however that may be, there can be no doubt of the necessity at the present time of active co-operation on the part of every one of the Society's members to increase its influence for the general good. As we have on former occasions endeavoured to urge, there is especial need for greater vitality among the provincial representatives of the Society. The position of local secretary is not merely one of honour but also one of responsibility, and the Council might in many instances be assisted in its work if the members in various localities, under the lead of the local secretaries, took a more active part in dealing with pharmaceutical affairs. Hitherto there has been too much apathy in regard to the election of local secretaries, and the circumstances of the case do not appear to furnish any sufficient reason for that want of interest.

One important feature of the Council proceedings was the presentation of the report of the Government visitor of examinations, which had been forwarded from the Privy Council Office. This report is published in the present number of the Journal, but as it has been referred to the Board of Examiners for consideration, it will be undesirable to comment upon it further than by pointing out that in several of its suggestions it contributes a strong argument for the establishment of the compulsory curriculum which the Council is now endeavouring to bring about. Some communications in reference to the Railway Rates subject were presented, as well as letters from the Board of Trade and most of the Railway Companies, acknowledging receipt of the Council's memorial published in the Journal of the 18th May. It appears to be the general intention of the Railway Companies not to alter the rates hitherto charged, but if any variation were made it would always be with the view to encourage the development of traffic.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, June 5, 1889.

Present—

Messrs. Allen, Atkins, Bottle, Carteighe, Cross, Evans, Gostling, Greenish, Hampson, Harrison, Hills, Leigh, Martin, Martindale, Newsholme, Richardson, Robbins, Schacht, Southall and Watt.

Mr. MICHAEL CARTEIGHE took the chair, and announced that he had received a letter from Mr. Abraham expressing his regret that he would not be able to be present that day.

The minutes of the previous monthly meeting and of the special meeting on May 15 were read and confirmed.

THE LATE MR. FREDERICK BARRON.

A letter from Miss Barron was read, thanking the Council for the resolution of sympathy passed at the last meeting with regard to the decease of Mr. F. Barron.

ELECTION OF PRESIDENT.

Mr. EVANS suggested that the election of President should be conducted by motion, seconded, and voted for openly.

The CHAIRMAN said it had always been the custom to take the election by ballot, and it was in the power of any member under the bye-laws to demand a ballot on a resolution.

Mr. WATT supported the suggestion that the voting should be openly, on a resolution moved and seconded.

Mr. SCHACHT thought it was much preferable in questions where personal considerations came in, that there should be the protection of the ballot. He, for one, should much regret departing from the usual practice.

Mr. RICHARDSON moved—

"That the Council proceed forthwith to the election by ballot of a President, Vice-President and Treasurer of the Society."

Mr. GOSTLING seconded the motion.

Mr. WATT having again expressed his opinion that this was an antiquated and unsuitable method of election,

The CHAIRMAN said if there were anything wrong or antiquated in this mode of election it would be better to consider it carefully before the next election, but any change now made would come upon the Council rather as a surprise.

Mr. EVANS said it had been suggested once or twice before.

Mr. CROSS said he objected to the ballot, not because it was antediluvian, but because it was a modern excrescence.

Mr. HARRISON did not think it would be a convenient time to make a new departure just at the moment of electing the President. At the same time he sympathized with Mr. Evans's view, and thought the election of officers was a matter affecting the whole of the Society, and that the members had a right to know on what grounds the President was elected. He suggested that before the time came round again the matter should be considered and some fresh regulations made.

Mr. BOTTLE said he should support the continuance of the method which had been in operation for so many years. It would be exceedingly difficult to discuss the merits of different individuals round that table in their presence. They were bound by the charter to elect from amongst themselves the President, Vice-President, and Treasurer, and it would be very difficult to do so satisfactorily except by ballot.

Mr. MARTINDALE thought if the ballot were not adopted it would lead to a sort of caucus being formed outside the Council for the selection of names.

The motion was then put and carried, and on the ballot being taken,

MR. MICHAEL CARTEIGHE

was re-elected President.

The PRESIDENT begged to thank his colleagues very heartily for this renewed compliment. There were times when one would wish to take off the harness and feel a little more freedom in discussion, such as was possessed by other members of the Council; and this was a privilege which he had not enjoyed for a good many years. His views were expressed presidentially, and without the freedom and latitude which was the privilege of the other members. He need hardly say that if he felt it an honour to be elected to this office seven years ago, it was a still greater honour now.

Mr. ATKINS wished to express his satisfaction at the result of the ballot, and to say how deeply indebted the Council was to the President for having accepted office again. He would not enter into any controversial matters, but as an old member of the Council and brother officer he might say that Mr. Carteighe brought to the office the possession of simply unique qualities: he had an absolutely unparalleled acquaintance with the history and traditions of the Society, a memory which was never at fault, and he united in himself the scientific aspect of the calling and the political or trade side also. There was only one fault to find with him, and that was that he so identified himself with the Society that he might adopt the words of Napoleon, and say, "*L'etat*; *c'est moi*;" and his great qualities made it very difficult to find a successor to him. He wished to say, especially in the face of recent expressions of opinion, to which he would not further refer, that those around that table, who were most competent to judge of Mr. Carteighe's qualifications, had absolute confidence in him, and he heartily congratulated himself, his brother councillors and the constituency at large that the President had very graciously, and at a large sacrifice of time and relaxation, as well as of business, acceded to the unanimous wish that he should re-assume the office.

ELECTION OF VICE-PRESIDENT.

On a ballot being taken,

MR. ALEXANDER BOTTLE

was re-elected Vice-President.

The VICE-PRESIDENT thanked the Council very heartily for this renewed expression of confidence; he hoped to be able in the coming year to carry on the duties which fell upon him to the satisfaction of the Council.

ELECTION OF TREASURER.

On a ballot being taken,

MR. JOHN ROBBINS

was re-elected Treasurer for the ensuing year.

Mr. ROBBINS thanked the Council for the honour it had again conferred upon him. It was now a number of years since he was first elected Treasurer, and he was proud of the confidence placed in him; but as it was in his view very desirable that a change should occasionally be made in this office, he begged to announce that this would be the last time he desired to serve.

DECEASE OF AN HONORARY MEMBER.

The PRESIDENT announced that since the last meeting the Society had lost one of its honorary members, Dr. George Owen Rees, who was elected about thirty years ago. Dr. Rees was associated with Dr. Jonathan Pereira, was at one time a Censor of the Royal College of Physicians, and for many years took a great interest in materia medica and in chemistry in relation to medicine. Speaking from memory, he believed Dr.

Rees had assisted Pereira in one of the editions of his great work. He thought it would be graceful if he were authorized to write to the relatives of Dr. Owen Rees, expressing sympathy and condolence on this occasion.

This suggestion was agreed to.

Standing Orders.

The standing orders of the Council were re-enacted for the ensuing year.

Retirement of Mr. Savage.

The President said he referred three months ago to the fact that Mr. Savage had declined to allow himself to be put in nomination for the Council, and seeing the length of time that gentleman had been a member of the Council it would be only right that on his retirement some acknowledgment should be made of his services. He had received a letter from Mr. Savage, some portions of which he would take the liberty of reading. He there said, "Now that I am fairly severed from my associates on the Council I feel impelled to acknowledge with gratitude the lengthened period that I have been permitted to be a member of Council with such pleasant colleagues. For twenty-eight years it has been my privilege to meet month after month many kind and considerate friends. . . . . My defective hearing greatly interfered of late with my usefulness—and but for this I might, notwithstanding my 'youthfulness' of fourscore years, have presented myself again for re-election, for I do much regret having to leave so many kind friends, many of whom in all probability I shall never see again. Will you kindly convey to all of them my appreciation of their kindness, as I shall not now have the opportunity of doing so personally. During my time of office I think I have known eight Presidents, besides many other distinguished members of Council; out of the twelve portraits suspended in the Council Chamber the originals of eleven were well known to me. With the exception of my friend Mr. Bottle, no one but the late Mr. Squire (29 years) has been so long as myself on the Council. During the time I can recall many important events, and although some dissatisfied individuals ask 'What has the Pharmaceutical Society done?' I can truly say that much unrecognized good has been done." Accompanying the letter was a table giving the length of service of some members of the Council, viz., the late Mr. Squire, 29 years; Mr. Bottle, 30 years; G. Edwards, 26 years; T. Morson, 26 years; Mr. T. H. Hills, 21 years; Mr. Deane, 20 years; Mr. Mackay, 20 years; Mr. Waugh, 20 years; Mr. Greenish, 19 years; Mr. Herring, 19 years; Mr. Sandford, 18 years; Mr. Savage, 28 years. The reading of these names of eminent men, many of whom were now no more, rendered Mr. Savage's withdrawal rather saddening. He begged to move:—

> "That the members of this Council regret the retirement of their respected colleague, Mr. Savage, from his seat on the Council, and desire to record their high appreciation of the valuable services which he has rendered to pharmacy and the Society by his twenty-eight years of earnest and consistent work as a member of Council, during three years of which he filled the office of Vice-President. The Council further desires to assure Mr. Savage of their best wishes for the future, and to express a hope that his health may long permit him to take an active interest in pharmaceutical matters."

In formally proposing the resolution he might say that Mr. Savage had not only himself contributed to the progress of pharmacy, but one of his sons was doing for medical science, and one branch of it in particular, work which had made the name of Savage, of Brighton, well known to the whole medical profession. They might congratulate their friend on the fact that he had a worthy successor, who occupied a prominent position in the great world of London

The Vice-President in seconding the motion said it was a little painful for him to do so, because it was a reminder that one after the other the old friends he had been in the habit of meeting there, from Jacob Bell downwards, were passing away, and that his own time was approaching.

Mr. Watt wished to endorse what had been said by the President, having been much attracted to Mr. Savage from the first time he came on the Council as a thorough gentleman who sympathized strongly with all the objects of the Society.

The motion was put and carried unanimously.

Secretary and Registrar

Mr. Richard Bremridge was re-appointed Secretary and Registrar for the ensuing year.

Editor and Sub-Editor of the Journal.

Dr. B. H. Paul was re-appointed Editor, and Mr. F. Passmore Sub-Editor, of the Journal for the ensuing year.

Curator.

Mr. Holmes was re-appointed Curator of the Society's Museum for the ensuing year.

Assistant Secretary.

Mr. J. R. Hill was re-appointed an Assistant-Secretary of the Society for the ensuing year.

Elections.

Members.

Pharmaceutical Chemist.

John Richards Strick, of Bath, having passed the Major examination, and tendered his subscription for the current year, was elected a "Member" of the Society.

Chemist and Druggist.

Charles Winter, of Bethnal Green Road, who was registered as being in business on his own account before August 1, 1868, having tendered his subscription for the current year, was elected a "Member" of the Society.

Associates in Business.

The following having passed the Minor examination, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Brunt, George Henry	Birmingham.
Cooper, George Dodd	Balham.
Hatton, Frederick William	Dorchester.
Smith, Albert	Manchester.
Stennett, William Whittaker	Harrogate.
Williams, John Llewellyn	New Buckenham.

Associates.

The following, having passed the Minor examination, and tendered their subscriptions for the current year, were elected "Associates" of the Society:—

Barnes, Colin Miller	Sunderland.
Cargill, David Allan	Arbroath.
Gunn, Alexander	Dunse.
Holt, Herbert Collins	Bowdon.
Nunn, Arthur William	Colchester.
Prince, Roland	Longton.
Routley, Edwin Walter	Bath.
Stewart, Alex. Stephenson	Edinburgh.
Ward, Albert Edward	Bradford.
Wheeler, Alfred	Bristol.
White, Woolmer R. Donati	Landport.
Woodcock, Bertrand Joseph	Newark.

APPRENTICES OR STUDENTS.

The following having passed the Preliminary examination, and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Allen, John Wilfred .....Douglas.
Betts, Harold George.....Smethwick.
Brander, William .....Turriff.
Brown, John.....Edinburgh.
Burrows, Harry .....Southgate.
Cay, Armistead George Winson.Exeter.
Clarkson, John.....Wigan.
Cowpe, Henry Fisher.....Preston.
Dann, Charles .....Whittington Moor.
Davey, Ernest James.....Cheltenham.
Davies, Robert Fisher.....Pontardawe.
Douthwaite, Henry Lonsbrough.Pocklington.
Eden, William James..... .....Manchester.
Exell, Edmund Charles.....Sheffield.
Gilbart, Sidney Frederic .....London.
Hale, Giles .....London.
Harrison, Frederick Charles ...Durham.
Holmes, John ....Bradford.
Jacks, Frederick.....Longton.
Kent, Thomas Oliver .....Wye.
Liggins, Thomas Pearson .....Putney.
Littler, John, junr.....Frodsham.
Lloyd, Douglas Macbean .....Wolverhampton.
Macnaughton, George .....Broughty Ferry.
Masterman, Henry .....Sowerby.
Morrow, Charles .....Hornsea.
Prosser, Harold Horatio.....Cardiff.
Sewell, James Walker .....Darlington.
Smith, Alfred Jason .....Gloucester.
Smith, Percy .....Gloucester.
Tattersall, John .....London.
Thompson, Edward Charles ...Sedgley.
Turton, Edwin E. H. .....Nottingham.
Wale, Arthur .....Wallington.
Waller, John .....Stanley.
Wing, John Joseph.....Boston.
Withington, Henry Martin ...Spalding.
Wrothwell, Fredk. James H...Northallerton.

Several persons were restored to their former position in the Society upon payment respectively of the current year's subscription and a fine.

The PRESIDENT said one gentleman was applying to be restored to membership whose name was well known to them all, and he thought they would be interested to hear the following letter:—

"St. Thomas' Hospital,
"*June* 4, 1889.

"To the President and Council of the Pharmaceutical Society of Great Britain.

"Gentlemen,—I hereby beg to make a formal application to be restored to the Register of Pharmaceutical Chemists, and to be re-admitted a member of the Pharmaceutical Society of Great Britain.

"On reference to the proceedings of the Council on December 6th, 1884, it will be found that I then requested not to be re-appointed an examiner, on the ground that I had accepted an appointment of a purely medical character in St. Thomas's Hospital. My request was acceded to, and in accordance with the provisions of Clause XI. of the Pharmacy Act, 1852, my name was removed from the Register of Pharmaceutical Chemists, and from the roll of members of the Pharmaceutical Society. I have always regretted that the law made this necessary, but I have now to state that I am not engaged in medical practice of any kind, and that I am not likely to be so engaged for many years to come. It would give me very great pleasure to again become a member of your Society, from which I have derived so many substantial benefits in the past, and to which, in the future, I should be proud to belong if you do me the honour of acceding to my request. I am, gentlemen,

"Your obedient servant,
"SIDNEY PLOWMAN."

The PRESIDENT then explained the reasons which had made it desirable to insert the provision in the 1852 Act, that any one practising medicine should not be eligible to be a pharmaceutical chemist, or a member of the Society, and having read the section pointed out that on ceasing to practise medicine Mr. Plowman might again be placed on the Register of Pharmaceutical Chemists and become a member of the Society.

Mr. HAMPSON remarked that in several cases gentlemen who had gone farther in their studies, and taken out medical diplomas, had been obliged to give up their connection with the Society. He knew two or three instances of men eminent in the profession who would add lustre to the name of the Society if they still belonged to it, and who, he had not a doubt, if the law were amended, would be happy to become again members of the Society.

The PRESIDENT observed that Mr. Plowman had a distinct claim, having been examined.

Mr. ATKINS thought it was quite clear that a medical man might requalify on giving up medical practice.

The PRESIDENT said that was so, if he had been examined. In putting the motion that Mr. Plowman be restored to membership he might express the hope that that gentleman would meet with every success in the important professorial chair which he was going to fill in Melbourne.

Mr. GOSTLING wished to endorse the remarks of Mr. Hampson, that it would be very desirable if the Act could be amended. He felt it a great hardship that his own son had to leave the Society on entering the medical profession.

Mr. ROBBINS remarked that a similar law prevailed in France, and it had been remarked to him as somewhat of an anomaly that whereas a medical man could practice at the age of twenty-one, a pharmacist could not be fully qualified until he was twenty-five.

The PRESIDENT said it was against the law in France for a medical man to supply medicine, which was not the case here. A medical man in England might be on the Register as a chemist and druggist, but not as a pharmaceutical chemist.

The motion was then carried unanimously.

RESTORATIONS TO THE REGISTER.

The names of the following persons, who have severally made the required declarations and paid a fine of one guinea, were restored to the Register of Chemists and Druggists:—

Thomas Edward Ramm, 18, Bridgewater Square, London, E.C.
William Curtis West, 377, New North Road, Islington, London, N.

EXAMINERS FOR THE JACOB BELL AND REDWOOD SCHOLARSHIPS.

On the motion of the PRESIDENT, Messrs. Tanner and Saul were appointed to conduct the examinations for the Jacob Bell and Redwood Scholarships in the present year.

LOCAL SECRETARIES.

It was moved by the PRESIDENT that it be referred to the Library, Museum, Laboratory and House Committee to consider the nominations of local secretaries.

The SECRETARY reported that this year there were 323 towns entitled to have local secretaries as against 320 last year. Out of the 323 there were 184 from which nominations had been received, but from 139 there were no voting papers at all. Seven towns had

been added to the list, and four had been removed, showing a net gain of three. Of the 184 towns from which votes had been received, in 75 cases only one voting paper had been sent.

Mr. HAMPSON asked what sort of towns were included in the 139. Were they large towns?

The SECRETARY said he had not got out that information in detail, but they were probably small towns.

Mr. RICHARDSON asked if anything could be done to further the matter of appointing district secretaries in large towns?

The PRESIDENT said probably the Committee would consider that at the same time.

Mr. RICHARDSON said there was so much likely to result from the recent movement in London of appointing district secretaries that he thought it would be well if the same thing were done in large provincial towns.

Mr. CROSS suggested that the question of holding a conference of local secretaries might be considered at the same time.

The PRESIDENT said with regard to this motion there was one great difficulty which lay at the root of the whole thing, viz., how these gentlemen were to be appointed. It was singular that, like the Society itself, which was purely democratic in constitution, though the Council years ago decided that local secretaries should be elected by members and associates in every town, as a matter of fact the members would not take the trouble to vote, and the question was how far this mode of nomination should go on. Anyone who had gone through the list would see that it was a complete failure, even in large towns. In many cases votes were given utterly regardless of the special work to be done; in others care appeared to be taken. But in the majority of cases the members did not take sufficient interest in the matter to make the Council feel any confidence in dealing with the names sent up. It was often found that in towns with ten or a dozen members two voting papers came up, one for one gentleman and another for another, leaving the Council in a dilemma as to whom to appoint.

Mr. HAMPSON thought it was high time the Committee should go into the question fully, and consider whether any other mode of election should be adopted. There was a motion some time ago in favour of territorial representation on the Council, but the result in the case of local secretaries was no encouragement to proceed on that line at all.

Mr. SCHACHT suggested that the Committee should consider whether it was desirable to sever the duties of collecting subscriptions from those of local secretaries.

Mr. EVANS hoped the Committee would by and by find out what was the reason so little interest was taken in the matter.

Mr. RICHARDSON asked if it was understood that the Committee should consider whether election should cease and selection commence. He thought by a little inquiry the Council might select better men than the members elected themselves.

Mr. SOUTHALL thought if the members would elect the local secretaries that would be the best plan, but that method did not seem to work.

The PRESIDENT, having remarked that all those suggestions would no doubt be considered by the Committee, the motion to refer the subject to the Library Committee was carried unanimously.

APPOINTMENT OF COMMITTEES.

The Council went into committee to consider the arrangement of the different Committees, as the result of which the following arrangements were made:—

General Purposes.—The whole Council.—To meet at five o'clock on Tuesday evening, before the meeting of the Council, excepting in September, and at such other times as may be required.

Finance.—The President (Mr. Carteighe) and Vice-President (Mr. Bottle), and Messrs. Abraham, Allen, Cross, Evans, Harrison, Hills, Martin, Newsholme and Schacht.—To meet on the day preceding the Council meeting, and at such other times as may be required.

Library, Museum, Laboratory and House.—The President (Mr. Carteighe) and Vice-President (Mr. Bottle), and Messrs. Allen, Atkins, Cross, Evans, Greenish, Hampson, Hills, Martin, Martindale, Richardson, Robbins, Schacht and Southall.—To meet on the second Wednesday in every month, except August and September, and at such other times as may be necessary.

Benevolent Fund.—The President (Mr. Carteighe) and Vice-President (Mr. Bottle), and Messrs. Atkins, Gostling, Greenish, Leigh, Martindale, Richardson, Robbins, Southall and Watt.—To meet the day before the Council meeting, and at such other times as may be necessary.

Law and Parliamentary.—The President (Mr. Carteighe) and Vice-President (Mr. Bottle), and Messrs. Allen, Atkins, Hampson, Harrison, Hills, Martin, Martindale, Newsholme, Richardson, Robbins, Schacht and Watt.—To meet as occasion may require.

Building.—The President (Mr. Carteighe) and Vice-President (Mr. Bottle), and Messrs. Allen, Gostling, Hills and Robbins.—To meet as occasion may require.

Research.—The President (Mr. Carteighe) and Vice-President (Mr. Bottle), and Messrs. Greenish and Schacht.

Evening Meetings.—The Staff of the Society's School, the Editor, and the Curator were requested to assist the President and the Vice-President in making arrangements for the Society's Evening Meetings in London.

REPORTS OF COMMITTEES.

FINANCE.

The report of certain members of the Council acting as a Finance Committee was of the usual character, and recommended sundry accounts for payment.

The PRESIDENT, in moving the adoption of the report and recommendations, said there was nothing needing special remark. The receipts were, as usual at this time of the year, rather large, including a good many subscriptions, and also a payment from the publishers. £100 had been invested on the Benevolent Fund Donation account, as ordered last month.

The motion was unanimously agreed to.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£5 to a former associate and member (aged 62) suffering from chronic disease, and unable to follow any occupation. He had a like grant in June, 1888. (London).

£5 to the widow (aged 68) of a registered chemist and druggist, who had a similar grant in 1879, and another in 1884. (Huddersfield.)

£5 to a former member and subscriber (aged 70) who is unable to do much, and is mainly dependent on his family. (Glasgow.)

Another case had been deferred for further inquiries.

The VICE-PRESIDENT, in moving the adoption of the report, explained that the case which had been deferred was an application from a young widow, in which it did not appear to the Committee that a small grant, such as it had power to make, would be of any real service.

The report was unanimously agreed to.

LIBRARY, MUSEUM, LABORATORY AND HOUSE.

Library.

The report of the Librarian had been received, including the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
April	Day . .	469	27	8	20
	Evening .	182	15	2	10

Circulation of books.	Town.	Country.	Total.	Carriage paid.
April . . .	170	135	305	£1 10 8½

The undermentioned donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

For the Library in London—

History of the Royal College of Surgeons in Ireland, and of the Irish Schools of Medicine; also, a Medical Bibliography, by Sir C. A. Cameron, 1886. From the COLLEGE.

Technological Museum of New South Wales, The Useful Native Plants of Australia, including Tasmania, by J. H. Maiden, Curator of the Museum, 1889.
From the COMMITTEE OF MANAGEMENT.

Mathematical Questions and Solutions, edited by W. J. C. Miller, vol. 48, 1888. From the EDITOR.

Record of Experiments in the Manufacture of Sugar from Sorghum in 1888.
From the U.S. DEPARTMENT OF AGRICULTURE.

Institute of Chemistry, Register, 1889.
From the INSTITUTE.

Frey (E.v.), Der Kohlensäuregehalt der Luft in und bei Dorpat, 1889.

Jorban (N.), Vergleichende Untersuchungen der wichtigeren zum Nachweise von Arsen in Tapeten und Gespinnsten empfohlenen Methoden, 1889.

Lichinger (F.), Die officinellen Croton- und Diosmeenrinden der Sammlung des Dorpater pharmaceutischen Institutes, 1889.
From PROFESSOR DRAGENDORFF.

Kaiserliche Leopoldinisch-Carolinische Deutsche Akademie der Naturforscher, Nova Acta, Bd. 52, 1888.

—Biographische Mittheilungen und Nekrologe, 1881–1887. From the AKADEMIE.

Schär (E.), Ueber die Verbreitung chemischer Verbindungen in der Pflanzenwelt, 1888.
From the AUTHOR.

The Committee recommended the purchase of the undermentioned books:—

For the Library in London—

Fischer (E.), Exercises in the Preparation of Organic Compounds, 1889.

Clarke (F.W.), A Table of Specific Gravity for Solids and Liquids, new ed.

Griffiths, Treatise on Manures, 1889.

For the Library in Edinburgh—

Roscoe and Schorlemmer, Chemistry, volume 3, part 5.

Museum.

The Curator's report had been received, and included the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
April	Morning	468	33	12	19
	Evening	95	10	1	4

The following donations had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Specimen of Aluminium and Aluminium Steel.
From Mr. D. GREENHOUGH.

Specimens of the oils of *Retinospora obtusa*, *Lindera sericea*, *Tetranthera citrata*, *Artemisia glacialis*, *Salvia Sclarea*, *Meum athamanticum*, *Matricaria Chamomilla*, and of a species of *Carlina*.
From Messrs. SCHIMMEL and Co., Leipsic.

Specimens of chinoline bichromate, nitroso-dimethyl-aniline, amido-azo-benzol, benzil, benzoin, helianthin, diphenyl, fluorescein, β-naphthol-hydrazin, naphthol, and phthalic anhydride.
From Dr. W. H. INCE.

Specimen of Namoy oil.
From Messrs. EVANS, LESCHER and WEBB.

Specimen of Pichi. From Mr. J. MOSS.

To the Herbarium—

Specimen of *Rhamnus Purshiana*.
From Messrs. SCHOELKOPFF, HARTFORD and MACLAGAN, New York.

To the Society's Museum in Edinburgh—

Specimen of Uralium.
From Messrs. DUNCAN, FLOCKHART and Co.

Specimen of Sodium salicylate in scales.

Specimen of Sodium salicylate from the natural acid. From Mr. A. KINNINMONT, GLASGOW.

Specimens of the fruits of *Semecarpus Anacardium*; the seeds of *Entada scandens*; Mujun, a sweetmeat made from *Cannabis indica*.

The fruit of *Myristica fragrans* preserved wet. Maranta starch, from the Gondal State Experimental Farm, Kathiawai.
From Mr. T. STEPHENSON (Messrs. Kemp and Co.), Bombay.

Fine specimen of Iron Pyrites.
From Mr. DONALD MCEWAN.

Specimen of *Lathræa squamaria*, preserved wet.
From Mr. C. ARTHUR.

A letter of thanks had been received from Herr L. Reuter, Heidelberg, for specimens of senega forwarded to him from the Society's Museum.

The Staff of the Society's School attended and reported on their respective classes.

On the motion of the PRESIDENT, the report and recommendations of the Committee were adopted.

THE EXAMINATIONS.

The following communication from the Privy Council was laid on the table:—

Council Office,
May 21, 1889.

Sir,—I am directed by the Lord President of the Council to transmit to you, for the information of the Pharmaceutical Society, the enclosed copy of a report by Dr. Thomas Stevenson, on the examinations by that Society held in London during the year ending March 31 last.

I am, Sir,
Your obedient servant,
(Signed) C. L. PEEL.

The President, Pharmaceutical Society,
Bloomsbury Square.

Report on the Examinations held by the London Board of Examiners of the Pharmaceutical Society of Great Britain during the year ending March 31, 1889.

To the Lords of the Council.

My Lords,—The request of your lordships that I should visit the above examinations having been made towards the close of the year 1888, I was able to attend only five examinations. I have, however, had access to the records of all the examinations conducted during the year under notice, and from these the statistical information of this report has been compiled.

Preliminary Examination.

No. of candidates examined	1393
,, ,, who passed	733
,, ,, who failed	660
Percentage of failures	47·4

Of the rejected candidates, 350 failed in Latin, 276 in English, and 379 in arithmetic, 304 failed in

one subject only, whilst 26 failed in no particular subject, but were rejected in consequence of the fewness of their aggregate marks.

I have read a number of the answers of both successful and unsuccessful candidates, and have seen the marks awarded to them. The examination is by no means too severe, and does not prevent candidates subsequently presenting themselves at the Minor examination whose knowledge of the application of simple arithmetical calculations in pharmacy is defective. There is room for improvement in the quality of the work of the candidates at the Preliminary examination.

Minor Examination.

No. of candidates examined	852
,, ,, who passed	384
,, ,, ,, failed	468
Percentage of failures	54·9

Of the rejected candidates, 90 failed in chemistry, 29 in botany, 67 in materia medica, 59 in pharmacy, 44 in prescriptions, and 114 in dispensing; 316 failed in one subject only; whilst 106 failed in no particular subject, but were rejected in consequence of the fewness of their aggregate marks.

The large proportion of rejections has led me to carefully study this examination. I find it to be conducted with discrimination and fairness, and the method of registering the results of each examiner's opinion is admirable. The new examination rooms are well fitted for their purpose. It is not likely that a competent candidate will be rejected; nor is it probable that any quite incompetent candidate will be passed.

Nevertheless, the examination has some defects which it may be hoped the Pharmaceutical Society will remedy at no distant date. Though the Examiners form a Board, each Examiner acts by himself, asking questions and assessing the value of the answers without reference to his co-examiners. The examination is *vivâ voce*. It would be advantageous to have a paper set by the Board in the principal subjects. This would discourage the attempts of candidates to adapt their answers to what they suppose to be the requirements of particular examiners.

Some candidates are nervous, and do not sufficiently regain self-possession during a brief *vivâ voce* examination, to whom a written examination would be a boon. Moreover it is not desirable that a single examiner should have the power to reject a candidate in any subject without the candidate being examined by another examiner in that subject; and the two should concur in the rejection.

An extended syllabus of the subjects of examination is also desirable, so that (there being, at present, no compulsory educational curriculum for candidates), the pharmaceutical student may know to what portions of the field of knowledge his studies ought to be particularly directed.

At the Examination in Botany an elementary knowledge of the application of the microscope in the recognition of the more important plant structures might well be tested; and indeed such knowledge is necessary for the recognition of the sophistication of drugs.

It would be well were candidates examined as to their knowledge of the obligations imposed upon the chemist and druggist by the Pharmacy Acts, *e.g.*, as to the requirements of the law when poisons are sold.

Major Examination.

No. of candidates examined	108
,, ,, who passed	63
,, ,, ,, failed	45
Percentage of failures :	41·7

Of the rejected candidates, twenty failed in chemistry, six in botany and five in materia medica, twenty-three failed in one subject only; whilst eighteen failed in no particular subject, but were rejected in consequence of their aggregate marks.

Modified Examination.

Three candidates were examined, of whom one passed and two failed.

I have the honour to be
My Lords
Your obedient servant,
(Signed) THOS. STEVENSON.

May 18, 1889.

Mr. HAMPSON moved:—

"That Dr. Stevenson's Report to the Privy Council be received and referred to the Library Committee for consideration."

He did not think it desirable to discuss it now, and it would be much better considered first by a committee, which could confer with the examiners.

Mr. GREENISH seconded the motion.

The VICE-PRESIDENT said this document had been sent to the President, but the Council had no power to amend it or comment on it. He did not quite see what the Committee could do with it. It would be better to let it be considered by the Committee, as it naturally would be without any resolution, which seemed to him rather an irregular way of dealing with such a matter.

Mr. HAMPSON still thought it should be referred to the Committee. Of course it could not be said what the result might be, it might be the Committee would have no suggestions to make, but the report was of such importance that it ought to be considered, and it seemed to him the Library Committee was the proper body to deal with it.

Mr. ALLEN agreed with the Vice-President that this was an official document sent to the Council, which all could read and form their own ideas upon; but if anything came out of it it would come as new business, not as dealing with this report itself.

Mr. RICHARDSON thought it absolutely necessary that such an important document coming from the Privy Council should be very seriously considered, not by the Council in the first instance, but by the Committee to which Mr. Hampson had referred. It would be a great discourtesy to the Privy Council if it were not taken into serious consideration.

The PRESIDENT said the matter was not free from difficulty. Supposing the other Government visitor thought differently from his colleague, the Council would be in a difficulty in saying anything about it, and he did not know that Dr. Stevenson would make the whole of these suggestions when he had been at work a longer time. He simply gave his impression of the result of three months' work; some of his suggestions had been contemplated from time to time, and some of them were more questions of practicability than anything else.

Mr. HAMPSON thought the President's observations rather reflected on the common sense of the Committee, who would be able to deal with the matter in such a manner as not to embarrass anybody.

The PRESIDENT said these suggestions referred to the internal arrangements of the Board of Examiners, and he did not know how far the Council or a committee ought to consider details of that sort.

Mr. ATKINS said it would be impolitic to consider the matter in committee, and it was a question whether the suggestion should be taken up by any committee at this stage.

The PRESIDENT thought the report should be sent to the Board of Examiners for their consideration.

Mr. HAMPSON said he had long been under the impression that the old notion with regard to the Board of Examiners being unapproachable was a mistake. He

treated them with the utmost possible respect, as was their due; but, on the other hand, the Council was responsible for the examinations, and it seemed to him to be the clear duty of the Council to take the matter into consideration. The only question was, which Committee was best fitted to do it. He thought the Library Committee, which would confer with the Board of Examiners, would feel no embarrassment at all.

The VICE-PRESIDENT did not wish to prevent the matter being considered, but if it were referred the Committee would be bound to make a report.

Mr. SCHACHT said he was not quite sure that the Council could all at once come to the conclusion that it was desirable to modify the scheme of examination; but if this document were referred to the Committee, it could only be by way of expectation of a report being made. There was no need for haste in the matter; he thought it might rest where it was until someone thought well to move that the subject be taken into consideration, and it might then be referred to a Committee.

The PRESIDENT remarked that it would be unfortunate if the Committee came to a conclusion that some of these suggestions could not be carried out. It would be very awkward as regards the Visitor, who had not made this report to be submitted to a committee and criticized, but expected the examiners would consider at a convenient time whether certain changes could be made. His suggestion was to take no action on the report at all, but simply send a copy to the examiners for their consideration.

Mr. HAMPSON thought the President unduly magnified the whole position, and that the business plan was to send it to a committee.

Mr. WATT said this document was sent to the President for the information of the Council, and the question was how it should be entertained. It contained important recommendations from such a source, he thought the Council was bound to see either that they were carried out or were impracticable. The only question was whether the report should be considered first by the Council, by the Committee, or by the examiners, and he was disposed to agree with Mr. Hampson, that it should be sent first to a committee.

Mr. HILLS thought the publication of this report, which was made after a comparatively short experience of the examinations, would be quite sufficient for the present. No one was likely to forget these valuable suggestions, and probably the time would come before long when someone would bring forward a motion upon the subject.

The PRESIDENT remarked that some of these suggestions had been under the consideration of the Board of Examiners from time to time for a long while, and some had been made by members of the Council. Many of them were made with the view of strengthening the hands of the Council. For instance, one suggestion was that candidates should be examined in the poison schedules, but the answer was, there was no power to do so.

Mr. HAMPSON said the Committee could say so.

The PRESIDENT remarked further that Sir Douglas Maclagan, the Government Visitor in Scotland, might or might not coincide with this report, and the Council could not make regulations for the examinations in London which would not apply to the examinations in Scotland.

Mr. ATKINS asked if it would be considered discourteous not to refer this report to a committee.

The PRESIDENT said certainly not. It had never been done before.

Mr. ATKINS said the Committee might, on the other hand, report that after due consideration it did not see its way to adopt these suggestions.

The PRESIDENT said he should not like such a report to be made if he were the Visitor.

Mr. MARTIN thought some gentlemen were losing sight of the fact that this report was made to the Privy Council, and a copy was merely sent to the President for the information of the Society.

Mr. ALLEN said the thing was complete in itself; there was no need to take any action upon it.

Mr. HAMPSON said he should press his motion. The Committee was not bound to report next month or the following month; it was a matter which would naturally take considerable time, but it seemed to him this was the regular and proper way of dealing with it.

Mr. SCHACHT said it was more in form if anyone wished to have a modification in the examinations that notice should be given of it; it ought not to be referred to a Committee straight off. There ought to be first a discussion in the Council on the question of whether it was or was not desirable that the examinations should be modified. If the Council decided that they should, then it would be referred to a committee to consider what the modification should be.

Mr. MARTINDALE thought this report should go in the usual way before the Boards of Examiners and it would be for them to consider it, and make what representation they thought fit to the Council. The suggestions here made were more in accordance with the regulations in force by another examining board, but there was a difference of opinion as to which system was the best.

Mr. WATT thought as a general discussion had been allowed it would be a great act of discourtesy if no notice were taken of this communication, but the better way would be to refer it to the Boards of Examiners for their opinion.

Mr. SCHACHT said no notice had been given of such a motion, and he submitted it was not in order.

The PRESIDENT said a copy of this report would be sent in the ordinary course to the members of the Boards of Examiners, and he hoped the matter would be left there. He knew Dr. Stevenson's views, and there was a good deal to be said for the various methods of examination, and in three or four bodies with which he was acquainted the subject was rather a burning one; it was a question very much of money, time, and practicability.

Mr. HAMPSON said he thought it was not desirable to discuss the report itself, and he had purposely avoided doing so.

The PRESIDENT remarked that the Bill now in Parliament proposed to divide the examinations, and to proceed somewhat on the same lines as were now suggested.

Mr. RICHARDSON suggested that the motion should be withdrawn.

Mr. HAMPSON said he should not withdraw it unless it was ruled to be out of order.

The PRESIDENT said he could not say it was out of order.

Mr. SCHACHT said it was unusual for a question of any moment to be introduced without a formal notice of motion.

Mr. HAMPSON altogether demurred to that statement, and said he remembered similar resolutions having been proposed, and in fact it was generally held that it was much better to refer a matter of that kind to a committee than to give a notice respecting it.

The PRESIDENT thought the Boards of Examiners would have a right to complain if so important a criticism of their work was sent to a committee without first being sent to them. The Council was really undertaking to do work for which it was not altogether fitted. The Boards of Examiners would have to consider this document perhaps for twelve months before making any definite suggestion, and then the committee would probably take another twelve months before it could thresh the matter out. The carrying out of these suggestions would involve new

bye-laws and a new Act of Parliament. Dr. Stevenson was not fully aware what powers the Society possessed, and probably thought that like an ordinary medical body it could do what it liked. He would move as an amendment:—

"That a copy of Dr. Stevenson's Report to the Privy Council be sent to each member of the Boards of Examiners."

He would not ask the Boards for any report upon it.

The VICE-PRESIDENT seconded the amendment.

Mr. HAMPSON protested against the notion that he was offering any affront to the Boards of Examiners.

Mr. RICHARDSON said if this course had been suggested in the first instance he should not have supported Mr. Hampson's motion. An important document like that should certainly be sent to some committee or authoritative body where it could be considered, and he did not see that it made much difference whether it was sent to the Boards of Examiners or to a committee.

Mr. SCHACHT said the great difference was that if it was sent to the Boards of Examiners they were not asked to make any report upon it, but if it was sent to the Committee it would be bound to make a report. It would be asking the Committee to report upon a thing which had not yet been determined should be the subject of modification. It was with the view to avoid dilemmas of that kind that the rule was laid down that a motion intended to be brought forward should be put on the agenda.

The PRESIDENT then put the amendment, which was carried by a considerable majority. It was then put and carried as a substantive resolution.

COURSES OF INSTRUCTION TO BE RECOGNIZED UNDER THE PHARMACY BILL.

The PRESIDENT said a letter had been received from a firm of solicitors, asking whether, in the event of the Pharmacy Act Amendment Bill becoming law, it was intended that candidates should be admitted to the examination on the production of a certificate that they had attended courses of instruction at private schools, provided the instruction given at such schools were of the nature and scope required. He would propose that an answer be sent similar to that sent last year to a like application, that it was the intention of the Council that the course of instruction in any school, when conducted in accordance with the rules and conditions that had been laid down from time to time by the Council of the Pharmaceutical Society, with the approval of the Privy Council, under the provisions of the proposed Bill, shall be recognized as qualifying courses of instruction under the said rules and conditions.

This was unanimously agreed to.

THE RAILWAY RATES BILL.

A letter had been received from Mr. Morison, of Edinburgh, enclosing a copy of the objections raised by the Scottish Trade Protection Society against the proposed classification and rates under the Railway and Canal Traffic Act.

Also a letter from Mr. Bell, of Hull, on the same subject, enclosing a copy of the objections he had sent to the Board of Trade.

A letter had been received from Mr. Marshall Leigh, enclosing copy of a resolution of the Brighton Association of Pharmacy which has already been published in the Journal.

A letter from the Board of Trade acknowledging receipt of the memorial from the Council was read.

Letters had also been received from most of the railway companies acknowledging the receipt of the Society's memorial. That from the Great Western Railway Co. stated that the revised classification schedules were not intended to supersede the rates actually charged. The company had no present intention of altering them, and in the future, as in the past, the rates would be fixed or varied from time to time in accordance with circumstances, and always with a view to encourage the development of traffic.

Mr. RICHARDSON remarked that all the companies had sent similar replies, saying they did not intend to raise the rates.

Mr. MARTINDALE: Only they want the power to do so.

THE INAUGURAL ADDRESS.

It was resolved that the Library, Museum, Laboratory and House Committee be authorized to make the necessary arrangements for the delivery of the Inaugural Address to the students in October.

GENERAL PURPOSES.

The report of this Committee included the usual letter from the Solicitor. One defendant had paid penalty and costs into court previous to the hearing; another had confessed judgment. In several cases a difficulty had been experienced in getting the requisite evidence.

The Council as usual went into committee to hear and consider this report.

On resuming, the report and recommendations were unanimously adopted.

Proceedings of Societies in London.

ROYAL INSTITUTION.

OPTICAL PROPERTIES OF OXYGEN AND OZONE.

A lecture on this subject was given by Professor Dewar on Friday, May 10. After explaining and illustrating the different varieties of spectra, and the difference between continuous, line, and band spectra, the lecturer proceeded to show some of these spectra as produced by oxygen. Schüster has concluded that not less than four different kinds of spectrum can be obtained from oxygen, and if ozone be reckoned as well, the number will be increased to six. The first is a continuous spectrum produced by the electrification of rarefied oxygen. The luminosity caused by passing an electric current through oxygen in a nearly vacuous tube was shown on a large scale, and was proved to be destroyed by the admission of a small quantity of some other gases, such as chlorine, but not affected by the presence of gases containing oxygen as a constituent; traces of nitrogen seem favourable to the production of this luminosity. With regard to the line and band spectra it has been noticed by observers of the solar spectrum, that towards sunset certain dark lines appear and become more and more distinct in proportion as the sun declines towards the horizon. From this it was reasoned that these lines must be due to a constituent of our atmosphere, as the sun's light would pass through a much greater thickness of it at sunset; in fact at 90° the thickness traversed would be thirty-five times as much as when vertical. These lines were studied by Brewster and Gladstone, and more completely mapped out by Angstrom, who found moreover that certain of these telluric lines disappeared after a continuous frost while others remained unaltered; from this he concluded that those which were removed by cold were due to vapour of water, while the others must be due to oxygen or carbon dioxide. The lecturer in conjunction with Professor Liveing has

been experimenting with the spectrum of oxygen under great pressure; a tube sixty feet in length was employed and oxygen introduced at a pressure of a hundred and twenty atmospheres, when lines were obtained exactly corresponding with those mapped out by Angstrom, the coincidence being particularly well marked in the characteristic groups of lines known as A and B, in the solar spectrum. A series of photographs taken at greater and greater pressures showed the gradual development and intensification of more and more of Angstrom's lines as the pressure increased. When liquid oxygen was used, bands were obtained, but not the characteristic A and B groups of lines. Professor Dewar had not time to deal in detail with the spectrum of ozone, but showed that it was very different from that of ordinary oxygen. He showed however a very remarkable experiment, viz., the production of ozone at very high temperatures. This was shown by passing oxygen over white-hot platinum, and very rapidly cooling it by means of solid carbon dioxide and ether; when the platinum was heated nearly to its melting-point the issuing gas gave the ozone reaction with iodide of potassium and starch paper.

An Attempt to Apply to Chemistry One of Newton's Principles.

On Friday, May 31, a lecture with the above title was given by Professor Mendeleef, or rather an English translation, revised by the author, was read for him by Professor Dewar. Professor Mendeleef showed how the universal prevalence of motion pervading all things had been gradually recognized, first in the case of the stellar systems, and now in the case even of molecules, light, heat, and electricity, being, like sound, only forms of motion. At present our knowledge of chemical action is not sufficient to bring it under the application of Newton's laws, but probably as our knowledge increases, the universality of Newtonian principles will be established and chemistry also will be shown to be governed by them. It is now universally accepted that molecules are in active motion, as shown by the phenomena of diffusion, but the probability of motion in the interior of molecules has not been similarly recognized. Up to recent times only a one-sided affinity has been recognized in chemical actions, and decompositions were explained by the assumption that the bodies combining had a greater affinity for each other than for those with which they were previously combined; for instance, that steam was decomposed by red-hot iron because the oxygen had greater affinity for the iron than for the hydrogen. However, in this, as in many other cases, if the conditions are reversed, the action will also be reversed, and the oxygen will show greater affinity for the hydrogen.

During the last ten years a gradual imperceptible change has been taking place in the views of chemists, and reactions are regarded, not as a fight ending in the victory of one side or the other, but as a conjunction of forces maintaining dynamical equilibrium. The manner in which a force producing chemical decomposition is regenerated by chemical combination, or *vice versâ*, was illustrated by Grove's experiment of dropping platinum, fused by the oxy-hydrogen flame, into water, the water being decomposed by the hot metal into a mixture of oxygen and hydrogen gases. Here the same force that was produced by the combination of hydrogen and oxygen to form water, is used in effecting the decomposition of water into the same two gases. The lecturer was led to the conclusion that it was not sufficient to conceive of static equilibrium of the atoms in the molecule, but that we must turn to dynamic equilibrium. He then proceeded to apply Newton's third law of motion, that action is always associated with, and equal to, reaction, to the facts of chemistry. Taking a molecule containing, for instance, three atoms, a, b and c, it is evident that the action of any one of them is balanced by that of the other two, and would be equivalent to it, so that a would be equal to b and c, b to a and c, or c to a and b. Consequently any of these equivalent portions or residues would be capable of replacing the others without destroying the equilibrium of the forces; for instance, in water one atom of oxygen and two of hydrogen are in equilibrium, so that one atom of hydrogen is equivalent to, or can replace dynamically, the residue of one oxygen and one hydrogen, while one oxygen can replace the residue of two hydrogen atoms. The application of this to the majority of the elements is at present difficult on account of their varying quantivalence, only carbon and its near analogues preserving constant functions of atomicity. Applying it to methane, CH_4, it is evident that the energy of one atom of hydrogen will be balanced by that of the remaining CH_3, two hydrogen by CH_2, three by CH, and four by C alone. In this way, by substituting the dynamic energy of CH_3 for one hydrogen (methylation), of CH_2 for two hydrogen (methylenation), of CH for three hydrogen (acetylenation), or of C for four hydrogen (carbonization), the various facts of isomerism, etc., are accounted for much in the same way as by the structural formulæ at present in use, but which are based on static conceptions. The substitution, therefore, of dynamic for static functions of the atoms in a molecule would not greatly alter our present views on the varieties of combinations in chemical compounds, and the lecturer felt confident that chemical doctrines would soon submit to Newton's laws.

Parliamentary and Law Proceedings.

Alleged Sale of Defective Sal Volatile.

On Saturday, at Bow Street Police Court, before Mr. Vaughan, the hearing of the summons taken out by the Inspector of Nuisances for the St. Giles's District, under the 6th Section of the Sale of Food and Drugs Act, 1875, against Mr. Chas. Ferdinand Keele, M.R.C.S., L.S.A., was resumed.

Mr. P. Howard Smith appeared in support of the summons, Mr. Forrest Fulton for the defendant.

Mr. Smith said he proposed to call some further evidence, as he understood the defendant proposed to contest the case.

Mr. Samuel Robert Lovett, sworn, examined by Mr. Smith.

You are Licentiate of Medicine and Midwifery at the Royal College of Physicians, Edinburgh?—Yes.

And a Licentiate Surgeon in Midwifery of the Royal College of Surgeons, Ireland?—Yes.

And a Licentiate Surgeon of Apothecaries?—Yes.

You have been in general practice, I believe, for thirty years?—Yes.

If you prescribe spiritus ammoniæ aromaticus, or calling it by its popular name sal volatile, what should you expect a chemist to give?—I should expect it to be prepared according to the present Pharmacopœia.

Which Pharmacopœia?—The British Pharmacopœia, certainly.

You supply your own medicines to your patients as a general rule?—I make up my medicines for my own patients; I do not sell medicines.

You get them from a wholesale chemist?—Yes.

What sal volatile do you get?—The British Pharmacopœia; if he supplied me with anything else I should not deal with him.

Cross-examined by Mr. Forrest Fulton.

You have of course been in practice a great number of years?—Yes.

When did you first enter the profession as a qualified medical man?—1860 something.

1867 or something like it?—Yes. I served five years in pharmacy before that with my father as an apprentice.

Are you a member of the St. Giles's Board of Works?—No; I am Medical Officer of Health.

They are the prosecutors in this case?—Yes.

I think I am right in saying that until the year 1885 the term sal volatile was not applied to spiritus ammoniæ aromaticus?—It is a synonym used for the first time in the British Pharmacopœia of 1885.

I think for practical purposes there was an earlier edition which was withdrawn, but the British Pharmacopœia first came into use in 1867?—I think so.

Up to 1867 you constantly had occasion to order sal volatile for the purpose of your profession?—It has always been in use as a medicine from the earliest date.

As a medical man in ordering would you order it as sal volatile or as spiritus ammoniæ aromaticus?—Spiritus ammoniæ aromaticus.

I am not asking you about a written prescription, but suppose you are ordering from the wholesale chemist would you order it as sal volatile or as spiritus ammoniæ aromaticus?—We commonly use the Latin terms.

Up to 1867 the only formula in use was that of the Pharmacopœia Londinensis?—Quite so.

I think I am right in saying that sal volatile is largely used as a compound in other medicines?—Yes.

I mean it forms an ingredient in important medical remedies?—Yes, most important.

I think I am also right in saying that sal volatile is very largely purchased?—Yes.

You do not keep an open surgery?—No; but I know the use of sal volatile.

It is very largely purchased by the general public. They go in and purchase an ounce or two ounces, and ask for it as sal volatile?—Yes, and the more reason that it should be right and good.

We will consider that question afterwards. The preparation known to the public, and which has been in general use between 1741 and 1867 is the sal volatile of the Pharmacopœia Londinensis?—You mean the profession, not the public.

I am talking about a member of the public going into a chemist's shop and asking for sal volatile?—The public would expect the article up to date whether in 1790 or now.

I am asking as a fact, supposing a member of the public went in and asked for 2 ounces of sal volatile from 1741 to 1867, would the only thing he could obtain be the sal volatile of the London Pharmacopœia?—Of that date.

It was not till 1885 that the term sal volatile was used at all in the British Pharmacopœia?—True.

Sal volatile, I apprehend, was purchased between 1867 and 1885 probably to the same extent as before?—Largely so. Synonyms were first used in the British Pharmacopœia of 1885, such as laudanum, paregoric, and sal volatile.

How about between 1867 and 1885, suppose a person going into a chemist's shop and asking for sal volatile, what do you say then he would have been served with, sal volatile of the London Pharmacopœia or the British Pharmacopœia?—The Pharmacopœia to date.

Which date. The only sal volatile known to commerce was that of the London Pharmacopœia. The term never having been applied till 1885 what do you say between 1867 and 1885 was the sal volatile of commerce?—Spiritus ammoniæ aromaticus. Sal volatile has been known for years by the words sal volatile.

What has?—Spiritus ammoniæ aromaticus.

Up to 1887 the only one in existence was the one in the London Pharmacopœia?—It was known long before that.

That is just my point. I want to know whether the sal volatile of commerce up to 1867 was not the sal volatile of the London Pharmacopœia?—I should say it was.

Is there any doubt about it?—I should say not. I forget anything about the Pharmacopœia Londinensis, it is so long ago.

Do you mean to tell me that you do not, as a medical man, constantly prescribe according to the Pharmacopœia Londinensis?—Never; it is obsolete altogether. I should never dream of doing such a thing.

Do you agree with Professor Redwood?—I am going into the medical part of the question not the chemical.

Do you agree with Professor Redwood that the Pharmacopœia Londinensis does exist as a recognized Pharmacopœia—that a medical man in giving a prescription, and wishing to prescribe sal volatile of the old kind, would put spiritus ammoniæ aromaticus P.L.?—Perhaps some of the old school would do so, but I do not agree with them.

You like it strong?—No; it is my standard—my code as a prescriber.

The British Pharmacopœia sal volatile is very much stronger than the old one?—I should suppose so.

An old lady who had been for many years in the habit of taking sal volatile for headache would be very much surprised if she got a stronger one than she had been used to?—The old lady ought to go to her medical man.

Sal volatile is a recognized remedy for headache?—Yes.

You take so many drops in water?—Yes; it is a very good thing.

I want to know whether an old lady who had been in the habit of taking sal volatile for headache, and who went and asked for sal volatile, meaning the sal volatile which had been in existence for 140 years, if she were given the sal volatile according to the British Pharmacopœia, it would wake her up?—Yes.

She might be very angry and think she had been poisoned?—I do not think she would think that.

Re-examined by Mr. Smith.

You were asked about sal volatile being an important ingredient in medicine; what is the important ingredient?—Ammonia.

With regard to the British Pharmacopœia, they have, have they not, since 1885, introduced synonyms to describe certain things, such as laudanum?—Yes.

That was tincture opii?—Yes.

Now it is put as laudanum?—Yes.

And there are other instances?—Yes; paregoric.

Mr. Forrest Fulton: In giving an order do you give the order as spiritus ammoniæ aromaticus?—Spiritus ammoniæ co.; we write it shortly.

Mr. Vaughan: Is the sal volatile of commerce at the present day the sal volatile which is prescribed according to the standard of the British Pharmacopœia?—Certainly; it is most important in this way. Sal volatile is a domestic medicine. Take the instance of a person suddenly attacked with syncope, and you say as a medical man—keep a quantity of sal volatile about, and if it is not of the reliable strength, according to the British Pharmacopœia, it would be a most serious thing.

Mr. Vaughan: I do not see the ground on which this case is defended.

Mr. Forrest Fulton: I will endeavour to make myself clear when I have the opportunity of addressing you.

Mr. Vaughan: I mean by the cross-examination. We have the Act of Parliament before us, and it says that after the Act is passed the British Pharmacopœia must be taken to be the pharmacopœia according to which pure medicines must be compounded.

Mr. Forrest Fulton: When my friend has closed his case I shall be happy to place before you my argu-

ment. I shall place before you the view we take of the matter, and then your decision will be given. There is a view of the matter which I could not explain in a moment in the middle of my friend's case.

Mr. Walter Temple Cooper, sworn, examined by Mr. Smith.

You are a pharmaceutical chemist?—By examination.

And you carry on business with your father at 66, Oxford Street?—I am only assistant to my father.

How long have you been in business with him?—I have been his assistant about nine years.

You understand the pharmacopœia, and you make up medicines?—I am fully qualified.

Take two alternatives. Suppose you had a prescription given you by a medical man for spiritus ammoniæ aromaticus, how would you dispense it?—According to the British Pharmacopœia.

Supposing a gentleman came into the shop and ordered 6 ounces of sal volatile, what would you supply him?—With sal volatile of the British Pharmacopœia. We make it a rule if the drug is in the Pharmacopœia to supply it if it is asked for.

You have the British Pharmacopœia in your place of business?—And the London Pharmacopœia as well; my father has been in business so many years, and he used to use it.

Cross-examined by Mr. Forrest Fulton.

Your business I think is mainly a dispensing one?—No, both retail and dispensing.

Do you sell much sal volatile across the counter?—I suppose so.

To the general public?—We order 8 gallons at the time.

I suppose you know of the Pharmacopœia Londinensis?—Yes.

You knew that there was such a compound?—Yes, and in 1867 I knew of it.

Mr. John William Thomas Morrison, sworn, examined by Mr. Smith.

You are a chemist carrying on business at Osnaburgh Street?—Yes.

You have been a chemist for ten years?—I have been learning the business, and in the business altogether ten years.

You are divisional secretary of the Pharmaceutical Society for West St. Pancras?—Yes.

If you had a prescription from a medical man for spiritus ammoniæ aromaticus what would you supply?—Spiritus ammoniæ aromaticus.

Prepared according to what pharmacopœia?—According to the British Pharmacopœia of 1885.

If a customer came into the shop and asked for sal volatile what would you supply?—Sal volatile according to the British Pharmacopœia of 1885.

Mr. Forrest Fulton: I have nothing to ask you.

Mr. Smith: That is my case.

Mr. Forrest Fulton then proceeded to address the magistrate on behalf of the defendant. He commenced by stating that Mr. Keele was a Licentiate of the Society of Apothecaries, and as such was of course entitled to practice as an apothecary. The defendant desired that point to be made clear at the outset, because since the last hearing a letter had appeared in the press in which it was stated that Mr. Keele was not a chemist.

Mr. Vaughan said he could not go into this matter. He had not even seen the letter in question.

Mr. Forrest Fulton pointed out that under the 16th Section of the Pharmacy Act, 1868, an apothecary was entitled to practice as a chemist. Dealing with the merits of the case he said it was a prosecution, not under the Pharmacy Act, but under the Food and Drugs Act, and it was very essential that attention should be drawn to the terms of that Act, because, being a penal statute, it must be construed strictly, and as much as possible in favour of the person charged with contravening its provisions. The preamble of the Act recited that: "Whereas it is desirable that the Acts now in force relating to the adulteration of food should be repealed, and that the law regarding the sale of food and drugs in a pure and genuine condition should be amended." Then came the section under which the prosecution was instituted: "No person shall sell to the prejudice of the purchaser any article of food or any drug which is not of the nature, substance and quality of the article demanded by such purchaser under a penalty not exceeding £20." That Act was passed in the year 1875. The Pharmacy Act was passed in the year 1868, the 15th Section of which provided that any person who should compound any medicines except according to the formula of the British Pharmacopœia shall be liable to a penalty of £5. The charge was for selling the compound, but the Act of 1868 was not incorporated in the Food and Drugs Act, and if the magistrate would turn to the 25th edition of Stone's 'Justice's Manual,' at page 288 he would find this passage: "There is no direction in the Act how an article is to be compounded. A clause in the Bill provided for compounding drugs according to the British Pharmacopœia, but it was struck out in the House of Lords." Surely that was a most important matter for consideration in a case like the present; that when the Act was drawn up the clause as to the £20 penalty was deliberately struck out.

Mr. Vaughan said he could not take any notice of this.

Mr. Forrest Fulton said he must ask his worship in interpreting the section to notice that the Act of 1868 was not incorporated in the Act of 1875, and this omission was done advisedly. The next point to consider was whether there was any authority binding upon the Court. The only case was that of White *v.* Bywater. There the facts were entirely different from the present. It was not pretended that the tincture of opium was compounded pursuant to the formula in any known pharmacopœia at all. The evidence clearly showed that it was not in accordance with the British Pharmacopœia, that it was not compounded even according to the formula of any known pharmacopœia at all; but was a tincture made up by the chemist. The Judges who tried that case did not say that the tincture must be made up according to the British Pharmacopœia, but that it must be the article known in commerce. Now, what was the history of the drug. It was admitted by Professor Redwood that this particular preparation which was sold was the sal volatile of the London Pharmacopœia, and that it was not adulterated. Here was an article of commerce which ever since 1721 had been purchased in enormous quantities from chemists; it was a preparation with which the public were familiar, and which they expected to receive when they asked for sal volatile. In the first edition of the British Pharmacopœia of 1867 appeared this note, "This preparation is stronger in spirit, and about one-half stronger in ammonia than the spiritus ammoniæ aromaticus of the London Pharmacopœia." But the term sal volatile was never applied to that till 1885, and the question was, could a man be prosecuted for selling a spurious article when he was selling an article which had been known for so many years? It was surely never intended that the Act of Parliament should be put in force against a man who had acted as Mr. Keele had done. He submitted that there being no provision in the Act as to how medicines were to be dispensed, the case did not come within the mischief of the statute, and that the defendant ought not to be convicted. In White *v.* Bywater the tincture was not made up according to any formula, but in the present case the sal volatile was made up according to the formula in the Pharmacopœia Londinensis.

The following evidence was then called on behalf of the defendant.

Mr. Christopher Coulthard, sworn, examined by Mr. Forrest Fulton.

Are you manager of the business of Mr. Keele?—Yes.

He trades as Keele and Co., at 260, Tottenham Court Road?—Yes.

You have been thirty-five years in business, and you are a member of the Pharmaceutical Society?—I am an associate of the Society.

You remember Mr. Hoyle making the purchases in question?—Yes; he asked for 6 ounces of sal volatile.

Did you serve him with the sal volatile in the shop?—Yes.

From whom had you obtained the sal volatile?—From Messrs. Battley and Watts.

When you give an order, how do you describe it?—Sometimes sal volatile, sometimes compound spirits of ammonia.

When you order that do you receive sal volatile according to the London Pharmacopœia, or the British Pharmacopœia?—We have both in the house.

When you give the order do you specify what you want?—No.

When you want the British Pharmacopœia do you order British Pharmacopœia?—Yes.

When you order sal volatile simply do you order Pharmacopœia Londinensis?—We do sometimes. Messrs. Battley and Watts sent us Pharmacopœia Londinensis last time; but we keep both in the house.

Supposing a customer asked for sal volatile, which would you give him?—I should give him the ordinary Pharmacopœia Londinensis.

Has that been your practice during the thirty-five years you have been in business?—Always.

Supposing sal volatile was prescribed, would you make it up according to the Pharmacopœia Londinensis or the British Pharmacopœia?—British Pharmacopœia.

Do you sell much sal volatile to the public across the counter?—We sell a great quantity.

The particular preparation you sold was purchased on March 29, 1889, of Messrs. Battley and Watts?—It was.

Did you sell it in precisely the same state as that in which you received it?—Exactly the same.

Have you ever received any complaint from the Board of Works with regard to any drug you sell?—Never.

Of any kind?—No.

Cross-examined by Mr. Smith.

You do not specify what you want in the order?—No.

Sometimes you get British Pharmacopœia and sometimes Pharmacopœia Londinensis?—Yes.

They send whatever they like?—Yes; the difference in price is so immaterial.

Which costs the most?—The British Pharmacopœia costs 2*d.* a pound more.

Is there any distinguishing mark on the two when sent?—Messrs. Battley and Watts call sal volatile according to the Pharmacopœia Londinensis, "compound spirits of ammonia."

Your employer does not care which he has?—It is immaterial.

Do you know the difference between the two in ammonia?—Yes.

When did you first find that out?—Seven or eight years ago.

Do not you think as a chemist that ammonia is an important thing in sal volatile?—Certainly it is.

What difference do you make in the retail price of 6 ounces between British Pharmacopœia and Pharmacopœia Londinensis?—We do not make any difference.

You charge 3*s.*?—The same price for both.

If you sell Pharmacopœia Londinensis to the public you make more profit?—2*d.* a pound more.

Re-examined by Mr. Forrest Fulton.

You keep the British Pharmacopœia preparation for the purpose of prescriptions?—Yes.

If you wanted the British Pharmacopæia preparation you would give the order for British Pharmacopœia?—Yes.

If you simply order sal volatile you get Pharmacopœia Londinensis?—Yes.

Mr. John Manning Watts, sworn, examined by Mr. Forrest Fulton.

You are manager of Messrs. Battley and Watts, wholesale druggists, of 32, Whitecross Street?—Yes.

Your firm are in a large way of business I believe?—Yes.

Are your firm in the habit of supplying Mr. Keele with drugs?—They are.

You supplied them with one pound of sal volatile on the 29th of March?—Yes.

You got it on the 6th of March from the manufacturers?—Yes.

How did the order reach you?—Spiritus ammoniæ aromaticus.

You sent them sal volatile according to the Pharmacopœia Londinensis?—Yes.

Is that your practice?—It is our invariable practice.

We hear that the British Pharmacopœia is a little dearer?—2*d.* a pound.

It is to your advantage to send British Pharmacopœia?—It would not make any difference to us.

When do you send the sal volatile according to the British Pharmacopœia?—Only when the letters "B.P." are put after the order.

When the order is for sal volatile you send it according to the Pharmacopœia Londinensis?—Yes.

How many years have your firm been wholesale druggists?—Since 1795.

Speaking for your firm and the trade, what is the article of commerce known as sal volatile?—Pharmacopœia Londinensis of 1851.

And as such you always supply it?—Yes, unless British Pharmacopœia were ordered.

Cross-examined by Mr. Smith.

You do not dispense it?—No.

You do not mix the ingredients?—No, it is sent out as we receive it from the manufacturers.

Do you supply medicine to medical men?—We do.

When a medical man, a physician, orders spiritus ammoniæ aromaticus what do you supply him?—The 1851 Pharmacopœia Londinensis. We never send out British Pharmacopœia unless it is ordered.

How many medical men do you supply?—I could not say. A great many.

Do you mean seriously to say that when spiritus ammoniæ aromaticus is ordered by a medical man you supply Pharmacopœia Londinensis?—Certainly.

Do you know the difference in strength between the old and the new?—Yes.

Do you know that it is half the strength?—I do.

Have they never complained to you about the strength?—We have never had a complaint.

Mr. Vaughan: Do you know that the Act of 1862 determines what Pharmacopœia is in future to be followed?—I was not aware that it forbade us from selling the sal volatile of 1851; that has always been known as the sal volatile of commerce.

Do you know that by the Act of Parliament the British Pharmacopœia alone was to be followed?—I did not know it.

And you are a member of a large firm of chemists?—Yes.

Mr. Vaughan: I am astonished.

Mr. Paul Thomas White, sworn, examined by Mr. Forrest Fulton.

You are a member of the firm of Alfred White and Son, of Castle Street, Saffron Hill, manufacturing chemists?—Yes.

You have been in trade since 1875?—Yes.

You have been in the habit of supplying sal volatile to Messrs. Battley and Watts?—For many years.

On May 11 did you receive from Messrs. Chester and Co. a copy of Dr. Redwood's analysis?—Yes.

Did you find it corresponds with the sal volatile which you are in the habit of selling?—Yes.

You supply an enormous number of wholesale druggists?—We treat them all the same.

Suppose you receive an order for spiritus ammoniæ aromaticus, what do you supply?—We should send sal volatile Pharmacopœia Londinensis, unless British Pharmacopœia were ordered.

That is your universal practice?—Certainly.

Cross-examined by Mr. Smith.

You keep two sorts?—Certainly, we make two sorts.

Which do you make the most of?—Pharmacopœia Londinensis; the British Pharmacopœia costs a trifle more.

You are not a chemist?—I am a manufacturing chemist.

Do you know the Act of Parliament, which says that medicines are to be made according to the British Pharmacopœia?—If used for dispensing of course it is.

You draw the distinction?—Yes; I am not a dispenser; I am a manufacturer.

Mr. Forrest Fulton: With regard to the Act of 1862, I think all that is said is that the British Pharmacopœia shall have from the passing of the Act the authority which was formerly held by the Pharmacopœia Londinensis, which at that time was the recognized pharmacopœia in the trade; there is nothing which says that from the passing of the Act all medicines should be dispensed according to the British Pharmacopœia.

Mr. Vaughan: The Act says that the British Pharmacopœia shall for all purposes be deemed to be substituted.

Mr. Forrest Fulton: It does not say that no medicines are to be dispensed according to the London Pharmacopœia.

Mr. Vaughan: It does according to common sense. If you look at the preamble I think it is clear that is so. It says, "And whereas different pharmacopœias have been in use in England, Scotland and Ireland, and whereas the pharmacopœia to be published is intended to supersede the above-mentioned pharmacopœias."

Mr. Forrest Fulton said the London Pharmacopœia itself was not binding upon anybody at that time.

Mr. Vaughan, in giving judgment, said this was a summons taken out at the instance of the Board of Works for the St. Giles's District against the defendant for having sold a certain drug which was not of the character, quality and substance demanded by the purchaser. That charge had been substantially proved by the evidence given by Professor Redwood, both in the evidence which he gave and in his certificate. He said: "The sample has a specific gravity of ·91898, and one fluid ounce of it neutralizes 230 grain measures of the volumetric solution of oxalic acid, representing sal volatile, the strength of which has been reduced by omitting part of the alcohol and a great part of the ammoniacal salt ordered in the British Pharmacopœia." He also said that he was of opinion that the sample of sal volatile had been reduced by omitting part of the alcohol and a great part of the ammoniacal salt ordered by the British Pharmacopœia. Professor Redwood gave evidence fully confirmatory of this certificate, and he also referred to the British Pharmacopœia as confirmatory of his statement. It could not be doubted that at all events the sal volatile sold by the defendant to Hoyle was not in conformity with the requirements of the British Pharmacopœia. That being the case, was the offence committed which was charged against the defendant? It appeared to him that about that there could be no question, unless it was to be assumed and taken as a fact that the Acts of Parliament which had been passed on the subject were to be entirely ignored, and treated as non-existent. The evidence which was called for the defendant seemed to be simply the evidence of the defendant himself, because it was the evidence of his manager, the evidence of the wholesale chemist who supplied him with the sal volatile, and the evidence of the manufacturer. In point of fact they were all in the same boat; one came simply to say that he made and then sold to the wholesale chemist that which the wholesale chemist sold to the retail chemist. He placed very little reliance upon their evidence, because it seemed that according to what he now learnt they were in ignorance of the existence of the Act of Parliament of 1862, and that being so it might very well be that they may have acted upon the knowledge which they previously possessed that there was this spiritus ammoniæ aromaticus which they manufactured according to the formulæ in the London Pharmacopœia, that they had been in the habit of doing it, and that they did not take trouble to inquire whether there was any alteration in the law which prohibited them from manufacturing and selling, or whether or not they had a right to sell and to manufacture according to the London Pharmacopœia. He could not look at the provisions which were contained in the Act of 1862 without coming to the conclusion that the sale of sal volatile made up according to any other pharmacopœia than the British Pharmacopœia was a violation of the Act of Parliament. He thought that view of the Act was entirely confirmed by the judgment which was given in White *v.* Bywater, where it was held that if a person asked for tincture of opium he was entitled to be supplied with tincture of opium of the substance and quality which was known in commerce, and not with tincture of opium of an inferior substance and quality. That case went up from the magistrate at Sheffield, who dismissed the case, because he thought that if the purchaser had in some way specifically asked for tincture of opium made according to the recipe in the British Pharmacopœia and had been supplied with tincture of opium which professed to be so, there would be a ground of complaint, but that in the absence of special request, the complaint made did not lie, inasmuch as the analyst's certificate showed that the purchaser got tincture of opium, which was what the complainant asked for, although to him and others it had a special meaning. It seemed to him that view was the view presented by the learned counsel who appeared for the defendant, but that was not the view taken by the judges in White *v.* Bywater; they were of opinion that the magistrate ought to have convicted, and they sent the case back to him in order that he might deal with it according to the opinion which they themselves expressed. He could not entertain any doubt, therefore, that in the present case the article which was supplied by the defendant was not of the nature, substance and quality demanded, and he was bound to convict. That being the case, the only question was, what penalty ought to be imposed? As he had already said, if it were proved that the defendant had purchased, and sold the sal volatile in the same manner in which he purchased it, that is to say, if he had not altered or diluted it, a nominal penalty was sufficient. He was still of that opinion; but he hoped this conviction would have the effect of inducing all persons trading in drugs to understand that the provisions in the Act of Parliament must be complied with, and that the prescriptions given as to composition in the British Pharmacopœia must in all cases be followed in dispensing medicines. He thought the justice of the case would be met by imposing a penalty of 40*s.*, and 2*s.*, the cost of the summons.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE COUNCIL ELECTION AND MR. BRYAN'S CIRCULARS.

The following correspondence has been forwarded to us with a request for publication:—

[*Copy.*]

"3, Hanover Street, Hanover Square, W.
"*May* 31, 1889.

"Sir,—I received from you two communications concerning the advisability of my voting against certain candidates for the Pharmaceutical Council on the grounds of their being in favour of vivisection; one containing a form to fill in, expressing my antagonism to vivisection. Not being of the same opinion as your Society I purposely ignored your circulars, especially when I found the absurdity of your proceedings, inasmuch as you did not even know the views of those gentlemen for whom you asked me to vote, and, evidently, had not taken the trouble to ascertain. Judge then of my surprise when I, two days ago, received, in company with several more pharmacists of the same opinion as myself, another circular thanking 'those who joined them in opposing the introduction of vivisection, or the patronage thereof, to the Pharmaceutical Society.'

"The only thing I could imagine was that your Society was so rich that it sent 'return thanks' circulars to those who opposed it, as well as to those who supported it, which seems to emphasize the 'ridiculous character' of the proceedings, so rightly termed by the editor of the *Pharmaceutical Journal*.

"In your last communication you say the 'committee of chemists was perfectly successful in administering a caution to Mr. Carteighe as President, he having been placed last of those returned to the Council.' If this Committee is responsible for Mr. Carteighe's position at the bottom of the poll, which I doubt, I suppose it was equally responsible for Mr. Martindale's at the top. Now I think Mr. Martindale, if his 'Extra Pharmacopœia' may be taken as any criterion, is an ardent advocate of vivisection, as he gives numerous references to experiments in his book showing the utility of vivisection, and I hardly think he would do so if he did not believe in them.

"I notice in the list of 'Vice-Presidents' and also of the 'Committee' there does not appear the name of *one medical man*; comment seems superfluous.

"Another noteworthy fact is, that at the general meeting of the Pharmaceutical Society, after the challenge by the President 'that if any twenty-eight members of the Society have anything to say, let them come here and say it,' not one was found who had 'anything to say,' among those enthusiastic (?) opponents of vivisection, if any of them were present.

"I may say I intend sending a copy of this to the *Pharmaceutical Journal*.

"Apologising for troubling you at such length,
"I am, yours obediently,
"R. CASSWELL HARRISON."

[*Copy on a Post Card.*]

"20, Victoria Street, S.W.
"*June* 1, 1889.

"Sir,—You are mistaken about there being no doctors on our Committee. There are three, viz., Dr. Berdoe, Dr. A. Bowie, Dr. J. H. Clarke, while Dr. C. Bell Taylor, the great oculist of Nottingham, and Lawson Tait, Professor of Gynacology, Birmingham, are honorary members.
"Yours very truly,
"B. BRYAN."

[*Copy.*]

"*June* 2, 1889.
"3, Hanover Street, W.

"Sir,—Your reply to my communication *on a post card* seems a too flattering acknowledgment of my remarks concerning the lavish circulation of your 'return thanks' circulars, and it seem s evident you intend to take the hint.

"But let me warn you that in trying to avoid Scylla you rush not on Charybdis.

"In reply to the post card, I must adhere to my original statement, that in the list of 'Vice-Presidents,' and also of the 'Committee,' there does not appear the name of *one medical man*.

"Yours obediently,
"R. CASSWELL HARRISON."

[*Copy.*]

"20, Victoria Street, S.W.
"*June* 3, 1889.

"Sir,—I do not understand the first part of your letter of yesterday's date.

"In the latter part you repeat the mis-statement that we have no doctors on our Committee, when I have told you we have three. This looks like wilful perversity.
"Yours obediently,
"BENJN. BRYAN."

[*Copy.*]

"3, Hanover Street, W.
"*June* 3, 1889.

"Sir,—I am sorry you don't understand the first part of my letter; possibly it may be like myself, rather obscure; but I think if you compare it with the second paragraph of my first letter, you will hardly fail to do so.

"But I am more than sorry that you should find it necessary to charge me with 'wilful perversity;' but perhaps it was written 'in moments of anger and excitement (when) hard things are said of opponents, which do not always mean all they imply' (see your letter to the Editor of the *Pharmaceutical Journal* dated May 21). However I will be charitable, and assume such to be the case. But I can assure you that on *neither* the list of the 'Vice-Presidents,' or on that of the 'Committee,' sent by you to me, does the name of those medical men mentioned on your post card appear. But assuming, for the sake of argument, these gentlemen to be your supporters, are you prepared to 'back' (excuse the term) them against the whole remaining part of the profession? If so, then indeed there is no longer 'power in a multitude.'

'I am, yours obediently,
"R. CASSWELL HARRISON."

PHARMACEUTICAL SOCIETY OF IRELAND.

Sir,—Now that we have before us the authorized report of last meeting of our Council (P.S.I.) I think it behoves the members of the Society not to allow our President to resign that office, under the circumstances which have occurred, without in some way acknowledging his labours and sacrifices on behalf of the Society during the term he has been in office.

Although I am far from saying he was not justified in acting as he has done, I think he might have considered that he was placed in his position by the Society, and that he had the majority of the Council with him, and that he ought not to have surrendered, except to a general meeting of the Society, called to consider the matter; but as his resignation before this has become a matter of fact to be dealt with by the next Council meeting, and irrevocable unless by it he is re-elected, I am certain many—even of those who may not agree to all the details of the compromise, which chiefly he on our behalf negotiated with the Committee of the "Chemists' and Druggists' Association of Ireland,"—regret that this step should be forced upon him, and I venture to submit the question, How shall we express our appreciation of the labour and sacrifices he has made on behalf of the Society?

R. J. DOWNES, M.P.S.I.

F. P. Balkwill.—The question has never been raised in the Journal, and we think it highly undesirable that it should be, as such practices would be quite outside the functions of the Society.

E. Richards.—We do not find the statement which you appear to think requires correction.

W. Johnstone.—*Castanea vesca* (Spanish chestnut). The paper was not written by the person you mention.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Dymock, Grierson, Bannister, Edwards, Thresh, Widdowson, Hill, Morrison, Coleman, Moorbaf.

LESSONS FROM FIELDS AND LANES.

JUNE.

"A violet by a mossy stone,
Half hidden from the eye,
As fair 's a star when only one
Is shining in the sky."

From a development point of view the violets form a very interesting study. Towards the end of May and the beginning of June most of the species are to be found in flower, at least in the northern counties. The corolla of the violet is calcarate or spurred, one of the petals having its base hollowed out like a bucket, and into this bucket drops the honey from the nectaries. If the spur of *Viola canina* or *Viola odorata* be slit up it will be noticed that the two stamens which are opposite to it are furnished behind with little sacs which hang down into the spur; these are the nectaries or honey-secreting glands, and if they be examined on a bright day each will be seen to glisten with the sweet fluid which to bees and other insects is so irresistible. Some of the nectar has dropped into the spur, which makes a very efficient "drop-catcher," and here it is that the flower's insect friends expect to find it. These, robbers as they appear to be, are unwittingly doing a service to their host, or at least to its race; the spur forms such an efficient hiding-place for the honey that the insect before it can reach the tempting bait with its proboscis must first push aside the pistil and stamens, and in doing so it gets dusted with pollen. In most of the violets the flower is so arranged that the anthers are brushed by the insect after it has pushed aside the pistil; in this way the pollen is sure to get carried to another flower and so effect "cross-fertilization." It was shown conclusively by Darwin that cross-fertilized plants are always more vigorous than those fertilized by their own pollen. Let it be remembered, however, that the pollen to be effective must be deposited on the stigma of another flower *of the same species*. In plant communities, as in animal, "breeding in and in" leads to degeneracy. Yet, adapted as the violets appear to be for cross-fertilization, some of them at times produce flowers which never open, which produce abundance of seed, and which therefore must be self-fertilized. These flowers are known as *cleistogamous*, and seem designed on the principle that self-fertilization is better than no fertilization.

In cornfields, *Viola arvensis*, a variety of the pansy violet, is very common, and in general form much resembles its cultivated relative. Its most remarkable feature is its *stipules*, which are larger than the true leaves. *Viola lutea* is perhaps the most striking of all the violet tribe; on chalk downs and limestone hills its large bold-looking corolla forms a pleasing contrast to the delicate white saxifrages and starveling bedstraws, which are often its only companions. The yellow pansy is in reality one of the least developed of any of the violet tribe. Various facts point to the conclusion that all the violets were once of this primitive colour, and in the "bluest-blooded" of them traces of it may yet be seen.

Meadows and marshes are now clothed in their brightest garb, and to its brightness contribute not a little the buttercups or crowfoots. In the woods the delicate sweetness of the anemone is gradually giving place to the wild hyacinth, or "blue-bell" of the country children. The anemones and the crowfoots are relatives of the celandine; they belong to the same order, and some of them are gifted with the same foresight. The anemone (*Anemone nemorosa*) has a rhizome in which is stored the savings of the previous summer; *Ranunculus bulbosus*, the earliest flowering of the crowfoots, has the base of its stem thickened from the same cause. The anemone is interesting to the student as an example of leaf-like *bracts*; the three much cut leaf-like bodies from the centre of which the flower springs are not true foliage leaves, but bracts or floral leaves. When a number of bracts form a circle round the flower in this way they constitute an *involucre*, but there are better examples of this among the Compositæ and Umbelliferæ.

The most common species of buttercup in meadows are *R. acris*, *bulbosus* and *repens*. The first is always very evident from its upright habit and somewhat rounded many cleft leaves; its juice is acrid and poisonous. *R. bulbosus* may be distinguished from *R. repens* by its *reflexed* calyx, the calyx of the latter being spreading. *R. lingua* and *flammula*, the great and lesser *spearworts*, may be found flourishing in marshy places, and will be recognized at once by the lanceolate spear-like leaves from which they take their common name. *R. hederaceus*, the ivy-leaved, and *R. aquatilis*, the water crowfoots, may be found growing in the same ditch; they differ from all the other crowfoots in having white flowers, and the latter is remarkable in having two kinds of leaves, the submerged ones being *filiformly dissected*, while the floating ones are *trifid*. Many water plants are thus provided with such divided leaves, and the advantage of them is evident; by offering a large amount of surface to the action of the water more active nutrition is promoted, and their mobility renders them less liable to be injured by sudden alterations in the current. Perhaps the most conspicuous feature in all the marsh flora in May and June is the marsh marigold (*Caltha palustris*), also of the buttercup order; like the anemone it has a single floral envelope. As a rule, when only one floral envelope is present botanists agree to call it the calyx, and highly coloured and corolla-like as the envelope of the marsh marigold is we must conform to use and wont and describe it as a calyx, with the addition, however, of the adjective *petaloid*, in deference to the bright and petal-like appearance of its sepals. The honey-glands of the *Ranunculaceæ* form an interesting study; in the celandine and the crowfoots the nectar is to be found in a little pouch at the base of the petals; in the marsh marigold it is secreted by the pistil; in the columbine—one of the most highly-developed members of the order now at its best in woods—it is hidden at the base of the spur with which each of the purple, fantastic-looking petals is provided, and in the monkshood (*Aconitum Napellus*) two of the petals have become converted into nectaries, and two of the sepals form a hood for their protection. The structure of the flower in aconite is such that only humble bees can reach the nectar readily, but some of the honey-seekers actually bite a hole in the calyx, and so plunder the flower without conferring any favour in return.

Along with the crowfoots and calthas moist meadows now furnish an abundance of the cuckoo flower or "lady smock, all silver white," of Shake-

speare. Its botanical name is *Cardamine pratensis*, and its delicate white, lilac, or sometimes even pink petals form a pleasing contrast to the bright yellows among which it has made its home. Note that the petals are four, that they are arranged like a cross, and that each is provided with a stalk or claw (*unguiculate*); this arrangement, together with the fact of the stamens being *tetradynamous* (four long and two short), shows at once that it belongs to the natural order *Cruciferæ*. The leaves are *pinnate*, and from their comb-like appearance are sometimes also known as *pectinate*. The long pod, which soon takes the place of the flowers, is known as a *siliqua* (a kind of capsule in which when it is ripe the sides split away and leave the seeds attached to a false division or *replum*). In some of the *Cruciferæ*, such as the "shepherd's purse," now common in dry places, the capsule is shorter and broader, and is then known as a *silicula*, or little siliqua.

A botanical ramble in the beginning of June would be incomplete without some notice of the greater stitchwort (*Stellaria Holostea*), whose long brittle stems and graceful white flowers are now the most conspicuous feature of the hedge-rows. It belongs to the order *Caryophyllaceæ* and to the same genus as the chickweed (*Stellaria media*). The stitchwort, chickweed and mouse-ear chickweed (*Cerastium*) can always be distinguished from the allied members of the order by their *bifid* petals, and these are nowhere better seen than in the specimen before us. Without the aid of a lens it is sometimes difficult to discriminate between the common chickweed and some of the sandworts (*Arenaria*), which belong to the same order. If it be remembered that the common chickweed has always a well-marked line of hairs running up one side of the stem and changing sides at the nodes (leaf insertions) the difficulty at once vanishes, because the sandworts, when furnished with hairs, always have them diffused.

Erratum.—By an oversight in the previous article, on p. 950, the term "dichogamous" was erroneously applied, instead of "diclinous," to instances where the stamens and pistils are in different flowers.

ON THE OCCURRENCE OF SKATOLE IN THE VEGETABLE KINGDOM.*

BY PROFESSOR W. R. DUNSTAN.

(*From the Research Laboratory of the Pharmaceutical Society.*)

Among the many botanical specimens collected by the late Daniel Hanbury, F.R.S., and now deposited in the Museum of the Pharmaceutical Society, is a specimen of wood labelled *Celtis reticulosa*, which possesses an intolerable odour. When my attention was first drawn to this specimen by Mr. Holmes, its odour recalled to me that of α-naphthylamine, and as this substance had not before been noticed as a plant constituent I thought it would be worth while to make a chemical examination of the wood. I was able to obtain nearly 200 grams of material for the investigation.

By distillation with water a minute quantity of a solid crystalline substance was obtained. It possessed a fæcal odour, and after purification melted at 93·5° C. Its physical and chemical properties were not those of α-naphthylamine. It afforded a crystalline picrate, by the analysis of which the substance was shown to possess the composition of methyl-indole (C_9H_9N), and by its physical and chemical properties it was proved to be identical with the Pr·3methyl-indole,* or skatole, which Brieger isolated in 1877 from human fæces, and Salkowski soon afterwards obtained from among the putrefaction products of animal proteid. Nencki has observed the formation of the same substance when potash is fused with albumen, and it has also been prepared synthetically. Skatole from *Celtis reticulosa* corresponds in all its properties with synthetical skatole from propylidene phenyl-hydrazide.

The occurrence of skatole in a plant has not hitherto been observed; it has appeared to be a characteristic product of the bacterial resolution of animal proteid.

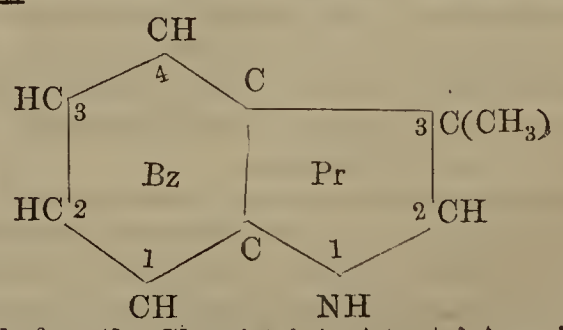
Indole is associated with skatole in human fæces, but no indole could be detected in the wood of *Celtis reticulosa*.

I am greatly indebted to Mr. Thiselton Dyer, Director of Kew Gardens, for the information he has given me concerning this tree. Mr. Dyer informs me that *Celtis reticulosa* is a tree of medium size growing in Java, Ceylon, and Eastern India, and that Thwaites has recorded the fact that "the freshly cut timber of this tree possesses a powerful and very disgusting odour." There is therefore no reason to doubt the authenticity of the specimens in the Hanbury collection.

I wish to thank Mr. W. A. Salter, one of the workers in the Research Laboratory, for the assistance he has given me with some of the experiments which have been made during the course of this investigation.

* Communicated to the Royal Society, June 6.

* The nomenclature followed is that which has been proposed by Emil Fischer. The benzene nucleus of indole being designated by the contraction *Bz*, and the pyrrole nucleus by the contraction *Pr*; the nitrogen of the pyrrole nucleus is numbered 1, as well as the corresponding carbon atom of the benzene nucleus; thus the formula of skatole is—



THERMOMETERS.†

BY FRANK BROWNE.

History.—The discovery of thermometers is attributed to several philosophers of the sixteenth century. Galileo's instrument, invented before 1597, was probably the first accurate one known. This consisted of a long glass tube, one end of which was blown into a bulb, the other dipping into coloured water. It was an air thermoscope and was the kind first used. Its scale was arbitrary and the readings incorrect, for the variations of atmospheric pressure had not yet been discovered. About 1611 Galileo substituted alcohol for air, and such thermometers were like those of the present day. They had large, usually spherical bulbs, and

† Read before the Chemists' Assistants' Association.

the degrees* intended to represent thousandths of the volume of the bulb were marked with beads of enamel fused on to the stem. As in the previous instrument, the scale was arbitrary. Down to about 1650, the freezing of water was believed to take place at variable temperatures, and this supposition was held also with regard to the boiling point. In 1665 Hooke wrote of spirit thermometers, describing their manufacture and graduation; saying also that zero on their scales was the freezing point of water. Halley in 1693 stated that water boiled at a constant temperature; in 1702, this statement was confirmed by Amontons. In 1694, Renaldeni of Padua proposed to graduate thermometers by taking as standards of temperature mixtures of definite volumes of boiling and ice-cold water. In 1701, Newton proposed, anonymously, a thermometric scale in which the temperature of freezing water was zero, and that of the blood of a healthy man 12°; he found that water boiled at 34°, as indicated by a linseed oil thermometer when graduated upon this scale. In 1714 Fahrenheit substituted mercury for linseed oil, and proved the dependence of the boiling point on pressure.

Three scales have survived. The Fahrenheit is the oldest, and dates from 1724. It is used popularly in Great Britain, the British colonies and the United States. This scale was primarily divided into 180°; zero was placed at temperate, a point corresponding with 9° C.; the point to which the alcohol rose when placed under the arm of a healthy man was marked 90°; and the temperature of a mixture of ice and salt, then believed to be the greatest possible cold, was marked 90°. In 1714 Fahrenheit again altered his scale: 0° was placed at absolute zero, and the space between this point and that representing the warmth of the human body was divided into twenty-four degrees. The freezing point of water was now 8°. But these long degrees being inconvenient, each was divided into four, and thus, instead of 8°, the freezing point of water became 32°, and blood heat 96°. A mercurial thermometer thus graduated registered 212° as the boiling point of water.

De Lisle in 1724 introduced a scale in which the boiling point of water was placed at 0°, and the temperature of the cellars of the Paris Observatory at 100°. The freezing-point of water became afterwards the upper point, as 150°. This scale was used for many years in Russia but is now obsolete.

In 1730 Réaumur made alcohol thermometers with their zero at the freezing point of water. On some of these the boiling point of water was 80°. Deluc introduced mercurial thermometers graduated from 0° in melting ice to 80° in boiling water; these, with Réaumur's name attached, are in use in Germany, Holland and other parts of the continent.

A centesimal scale in 1742 was adopted by Celsius; the boiling point was marked 0°, and the freezing point of water 100°. Linnæus reversed these points, and the scale is now known as the centigrade. This is no doubt destined to supersede all others; at present it is used universally in laboratories, and generally in all except English speaking countries for scientific purposes.

Uses.—Thermometers are instruments for measuring the degree of temperature. The measurement depends upon the law which enunciates that perfect gases expand equally for equal quantities of heat. With regard to this law some liquids behave almost as well as perfect gases, and for many reasons are used in preference to them. For thermometric purposes it is essential that the liquid employed should have a low freezing point, a high boiling point, a good heat conducting power, and a low specific heat; it should also be readily obtainable in the pure state. One possessing all these properties is found in mercury: it freezes at −40°, boils at 357°, has high conducting power, and its specific heat is such that the same quantity of heat which would raise water from 0° to 1° would raise this element from 0° to 30°.

The mercurial is not, however, so accurate as the air thermometer. 100,000,000 cubic millimetres of mercury measured at 0° become 100,017,915 cubic millimetres at 1°; and 100,000,000 cubic mm. at 300° become 100,019,413 cubic mm. at 301°; these facts show that as the temperature increases the expansion of mercury is not uniform. Air, on the other hand, expands twenty times as much as mercury, and equally for all temperatures. For low temperatures alcohol is most suitable, as it does not become solid till −130·5° is reached.* Ether is also much used. The expansions of these two liquids are 6 and 8½ times respectively that of mercury.

Manufacture.—To make an ordinary mercurial thermometer, a piece of hard glass tubing is first selected. The bore must be narrow and uniform. Its uniformity is ascertained by measuring a short column of mercury at different points of the tube. A bulb must now be blown. This varies in shape, size and thickness according to the purpose for which the thermometer is intended. It is sometimes spherical, pear-shaped, oval, cylindrical, or tubular. Very often it is made apart from the stem; this is preferable, as one can then be chosen possessing the right capacity. When made by blowing out one end of the tube, a small elastic bottle is fixed to the open end and compressed by the fingers. For sensitiveness the elongated form is to be preferred, as in proportion to its capacity there is a much larger surface for the conduction of heat. For this reason the gridiron, spiral, and bottle-shaped bulbs deserve notice. The thickness of the glass is also a matter of considerable attention, for if too thin the bulb will yield to atmospheric pressure and raise the zero point; if too thick the instrument will be insensitive. The tube having now a bulb at one end, a second is blown a short distance from the other end. When this latter is half cooled, the open end is dipped into pure, recently-distilled mercury, which gradually rises into the tube. By judicious cooling and heating the lower bulb is gradually filled. Held by a wire handle (fig. 1), the tube is heated over a furnace until all air has been expelled by the boiling mercury. This being done, and while the mercury is still boiling, the open end of the tube, which must not be too hot, is placed against a piece of sealing-wax, some of which drawn in effectually prevents the ingress of air. When quite cool the mercury perfectly fills the lower bulb and tube. The tube is now inclined and the lower bulb raised to a temperature higher than the thermometer is intended to indicate. Some of the mercury is thus expelled. As the column begins to retreat on cool-

* Except where the meaning is otherwise obvious, degrees Centigrade are intended.

* *Phil. Mag.*, 1883, 75.

ing, the tube is hermetically sealed just below the upper bulb, which is drawn off. The instrument is now stored for some time, or heated for several days to 50° or 100° above the temperature it is intended to indicate; the reason for this will shortly be seen.

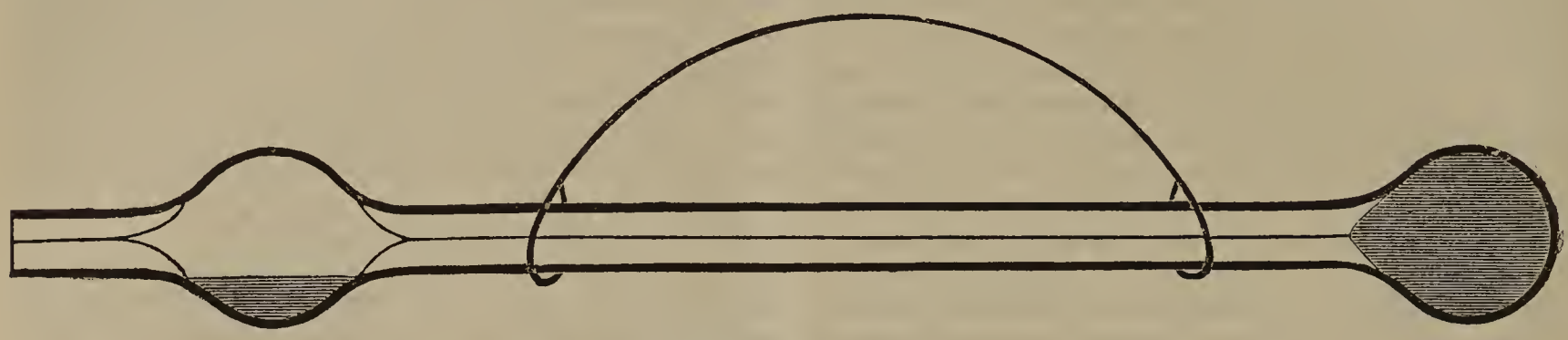


Fig. 1.—Filling the tube.

Two fixed points must now be taken. The lower is usually taken first. The thermometer is placed vertically in finely-pounded melting ice, or preferably snow if it can be obtained, contained in a vessel which will allow the water to drain away. When ice is used, it should be washed with water, for when it has the appearance of salt, it may be considerably lower than 0°. F. D. Brown finds that ice and water is better than ice only; also that the water used should be distilled, as when such is not the case, a temperature lower than 0° results.* The whole of the mercurial column should be immersed in the mixture. After from twenty minutes to half-an-hour the thermometer may be raised until the top of the mercury is seen just sufficiently for its position to be noted.

Some thermometers intended for use in very cold countries have a still lower point determined on their scales; it is the freezing point of mercury. The process is as follows:—From 17 to 20 pounds of mercury are operated upon; it is first cooled down to about −10°, together with the vessels, thermometers and ether used during the operation. The valve of a tube containing liquid carbon dioxide is unscrewed and gas allowed to escape for about a minute, during which time about 550 grains of solid carbon dioxide will be deposited in the form of snow. This is laid on the surface of the mercury, together with some ether. Having stirred up the mixture, the liberated gas and ether vapour, escaping through the mercury, rapidly cool it down and cause it to solidify on the surface, which is then stirred in. About 6 charges of acid snow and 6 ounces of ether are required to convert the mercury into a pasty consistence. When in this semi-solidified condition, the thermometers and standard are plunged in, and when the mercuric column begins to rise above the lowest point reached, comparison is made.†

The temperature of water boiling under a pressure of 760 mm. is the higher fixed point. To determine this the apparatus of Regnault is recommended, although in its absence a long necked flask will be found serviceable, if proper precautions are taken. The former consists of a cylindrical copper vessel with double sides, between which the vapour of water circulates. In this kind of boiler there is no possibility of the exterior air reaching the thermometer.* In order to ensure the regular escape of steam, a small manometer communicates with the interior of the boiler, to indicate the least pressure within. The whole of the mercurial column must be exposed to the vapour of the rapidly boiling water, but after a few minutes it may be raised just above the cork and its position noted. As the boiling point depends upon the pressure of the atmosphere, the height of the barometer must now be taken. If it stands at 760 millimetres the temperature is 100°. If not, a calculation will be necessary; 1° C. or 1°·71 F. must be added or subtracted for every 26·7 mm. above or below 760 mm. The interval between the two fixed points is then divided into 100 parts or degrees for a centigrade, or 212 parts for a Fahrenheit thermometer. To graduate the scale above 100°, a column of mercury is measured below that point, then made to pass above step by step; the portions of the tube filled by the column are then divided into the number of degrees which it represents. Craft recommends that graduation above 100° be effected by means of pure liquids, as naphthalene or benzophenone, whose boiling points, 218° and 306° respectively, under a pressure of 760 mm., he considers should be taken as fixed points. When these compounds are used, an apparatus similar to Regnault's should be employed.†

Errors.—There are several causes of error to which thermometers are liable; the greatest is due to the rise of the zero point. A thermometer tube having been filled with mercury, without further preparation the zero point is taken; if it be now put aside for several months, and this point be then again taken, it is seen to be considerably higher. This fact will be noticed sometimes even after intervals of many years, although the rise usually attains its maximum after one year; its extent varies from ·5 to 3°. This phenomenon has its fundamental cause in the imperfect elasticity of the glass. A perfect solid when heated expands, and in cooling returns to its original form, its contraction being equal to its expansion. Glass when heated expands, but does not return to its former dimensions for a considerable time after it has cooled. In the course of a few months after the thermometer has been filled the bulb generally shrinks by an amount of from $\frac{1}{4000}$ to $\frac{1}{2000}$ of its bulk. It must be remembered also that there is a vacuum inside the thermometer tube, so that the amount of shrinkage is increased by atmospheric pressure. Dr. Löwenberg supposes that, after having been heated, the particles of glass are in a state of tension produced by the slight conductibility of glass, which occasions a

* *Phil. Mag.*, vol xiv., p. 57.
† *Phil. Mag.*, 1886, p. 27.

* A figure of this apparatus will be found in the manuals of Ganot and Deschanel.
† *American Chem. Journ.*, vol. v., No. 5.

cooling or setting in successive layers, and he thinks that this abnormal tension may disappear in consequence of oft-repeated molecular movements. Legrand holds the same view.

That the bulb is elastic and yields to pressure has been shown by Mills and Egen.* They find that the expansion of the mercury produced by a pressure of two atmospheres is twice as much as that caused by one ; or, expressed as a law, the expansion experienced is inversely as the pressure. They observe also that a cylindrical is twice as rigid as a spherical bulb. The effect of the elasticity of the bulb may readily be comprehended from the results of some of Pickering's investigations. He shows that the bulb of every thermometer has two different shapes, one when the column is rising, the other when it is falling. He takes this view from some experiments in which he found that there was a considerable difference in the rate of heating and cooling, up to and down from certain temperatures. He further strengthens his supposition by calling into notice the fact that when the column of mercury rises to any temperature it will go on rising regularly afterwards ; but when it falls to that temperature a certain time elapses before it will begin to rise again, and although the mercury is expanding, the column is stationary, and therefore the bulb must be expanding and assuming a new form.†

(1) *Rising of the Zero Point.*—If a thermometer be graduated soon after manufacture the zero point after a short time rises and is incorrect. The graduation must therefore be deferred for a considerable time until no further rise takes place. As it may not be convenient to store the tubes, another method is fortunately at hand by which the period is greatly shortened. The thermometer is made and heated to a high temperature ; at the end of a few days, the zero rises to its utmost extent. The freezing point now taken remains afterwards nearly constant. At the Kew Observatory of the Royal Society new thermometers are always subjected to an annealing process, by heating the bulbs in a sand bath for three or four days. Hicks exposes the thermometer tubes for sixteen days to a temperature of 50° or 100° above the highest point which the thermometers are intended to indicate. They are placed in linseed oil ; this is gradually heated to the required temperature, and having remained at that point for the proper time, it is very slowly allowed to cool. Mercury or any liquid which does not act upon the glass may be used. By either of these methods a rise of 2° to 2·5° has been effected in sixteen days, which would have taken months, and probably years, to effect if the annealing process had not been used. It may be said that this error, caused by the rise of the zero-point, is very nearly in the inverse proportion of the expansion of the liquid contained in the bulb.‡ Mercury in this particular is not the best liquid for thermometers ; alcohol has been said to expand six times as much, and ether eight and a half times ; therefore the uncertainty of error in the case of alcohol is $\frac{1}{30}$, and of ether $\frac{1}{42}$, when the possible error in a mercurial thermometer is represented by $\frac{1}{5}$°.

(2) *Depression of the Zero Point.*—If a thermometer in which the bulb has contracted to its maximum extent be suddenly exposed to boiling water for a short time, the freezing point is found to be lowered by ·1° or ·2°; this is known as the "depressed freezing point." A satisfactory explanation of this phenomenon does not appear yet to have been given by any observer. On account of this depression it is customary to ascertain the freezing before the boiling point ; the reverse should be done if the instrument is intended for high temperatures, otherwise the readings taken will be ·1° or ·2° below.

(*To be concluded.*)

* *Phil. Mag.*, 1887, 406.
† *Phil. Mag.*, 1886, 330.
‡ 'Encyclop. Britannica.' (Heat.)

RELATION BETWEEN CHEMICAL STRUCTURE AND PHYSIOLOGICAL ACTION.*

[CROONIAN LECTURE.]

BY T. LAUDER BRUNTON, M.D., F.R.S.

I had intended at first to call the subject of my lectures "The Relation between Chemical Constitution aud Physiological Action," but I found that this title would not include the whole subject which I wished to discuss. For I wished to include the alteration which may be brought about in the physiological action of a substance by the simple multiplication of its parts without altering their arrangement, as, for example, the difference between the action of one of the lower alcohols,—ethylic alcohol, and one of the higher,—amylic alcohol. These two alcohols are built on exactly the same type, and the relation of the parts is similar, but the number of parts is greater—in amylic than ethylic. I therefore resolved to change the title of the lectures to the "Relation between Chemical Structure and Physiological Action," as the word "structure," I think, may be fairly made to include the number of component atoms in the substances as well as their relation to one another.

Chemical Constitution.—To make the subject of chemical constitution clearer, I may, perhaps, be allowed to make use of a very homely simile. I have here a pocket-knife with a number of blades. At present these blades are all shut, and the knife may be given to a child to play with or carried in the pocket without the least danger. If I open one of the blades, however, the case is very different. The composition of the knife is exactly the same as before, but by altering the relation of the parts to one another I have converted a harmless plaything into a dangerous weapon. In the case that I have just referred to, of the compound of nitrogen and carbon an alteration in the relation of its parts has a similar effect to the opening of the knife, and converts the comparative harmless nitrile into the deadly isonitrile, or carbylamine. In using this illustration I have followed the general statement regarding nitriles and carbylamines. Experiments on the action of these substances have given conflicting results, and the whole subject requires investigation. I began some experiments on the subject about thirteen years ago, but they were interrupted by the pulling down of my laboratory, in order to rebuild the medical school at St. Bartholomews, and I have not been able to resume them. Again, while I keep the same handle to my knife, I may alter its uses by opening out a boot-hook, a gimlet, or a file, and in a similar way we may alter the functions of an organic radical, which we may compare to the haft of the knife, by attaching to it an atom of amidogen, chlorine, or hydroxyl. If I wish to cut through a piece of cord, or something else out of my reach with my pocket-knife I may effect my purpose by tying my knife to a piece of stick, and, if that should not be long enough, attaching another and yet another piece until I have got my handle sufficiently long for my

* Extract from First Lecture.—Delivered Thursday, June 6.

purpose. Such a process as this may be compared to adding on carbon atom to carbon atom in a lengthening chain in the higher paraffins, but just as my shank would by-and-bye become too heavy and cumbrous to allow me to handle it, and thus become useless for my purpose, so we find that the higher paraffins, although from their high molecular weight they ought to be powerful anæsthetics, are too sparingly absorbed to have any physiological action at all, and instead of producing either intoxication or anæsthesia, like marsh gas, are simply used under the name of vaseline to protect the skin.

Formulæ.—In discussing chemical questions we are accustomed to use two sorts of formulæ—the graphic, in which we represent diagrammatically the relative position of the atoms in a compound; and the ordinary, in which we write down its nature in symbols. In trying to convey to you an idea of chemical constitution I have used one illustration which might be compared to a graphic formula, and, in order to make the matter clearer, I may, perhaps, be allowed to use another which is more analogous to an ordinary formula. In writing down chemical formulæ we use certain letters to denote the elements, generally the initial ones of their Latin names, and the number and position of those convey to a chemist in a certain degree an idea of the composition of the substance represented by them. With a comparatively small number of letters of the alphabet we are able to form a great number of words, and to represent a great number of ideas, and with a small number of elements we can form many compounds. Slight alterations in the composition of words, the introduction or abstraction of a single letter, will often completely change their meaning, and slight alterations in chemical substances will change their properties. Thus one often sees in railway carriages the announcement to passengers, "Wait until the Train Stops," modified by someone scraping out the T, so that it reads, "Wait until the Rain Stops;" and then someone else scrapes the lower half of the letter R, after which it reads, "Wait until the Pain Stops." I frequently see an example which is indeed, I think, a common one both in schools and colleges. On a certain door the words Class Room were originally painted, but certain ingenious students have amused themselves by obliterating first the C and then the L, and turning the original word first into Lass Room, then into Ass Room. Just as the successive removal of these two letters completely altered the meaning of the original word, so the removal of the letters symbolic of two elements from a chemical formula will completely alter the nature of the substance represented by it.

In both the instances which I have just given the alterations have been effected in the composition of the words by removal of the constituent letters, but the relation of the remaining ones to one another has not been altered. We are frequently able to make additions to a word which somewhat modify its sense without, however, altering its meaning in any essential particular. The root or radical remains the same, and the omissions only modify it. Thus we may say classroom, dining-room, drawing-room, bed-room, or we may say room, roomy, roomful; but in all these words we have the idea of a room as the essential meaning. By altering the arrangement of the letters, however, we produce a completely different effect, and instead of room, we get moor. By this slight alteration we convert a word suggestive of comfort, enclosure, warmth, and society into one suggesting expanse, exposure, cold, and desolation, a change which is paralleled by the example I have already mentioned of R C N and R N C. The word moor may also be modified in much the same way as the word room. Such modifications as I have spoken of usually affect the significance but slightly, yet occasionally a slight addition may alter the sense of the word as completely as a difference in its structure. Thus Moorish, instead of conveying a sense of bleakness and coldness, brings before the mind ideas of oriental grandeur, sunshine, and activity. The reason here of course is that the root moor in the two words moorland and Moorish, although alike in appearance and sound, are really quite different. But in studying the physiological action of various chemical substances, we find that while usually certain alterations or additions only modify the action of the radical to a slight extent, yet now and again we meet with quite unexpected cases where slight modifications produce an altogether unexpected effect. Thus sodium acetate has got a very slight physiological action indeed, but when one atom of hydrogen in the acetic acid is replaced by bromine, the result is mono-bromo-acetate of soda, which has got a most remarkable action upon the muscles of the frog, rendering them so rigid that the animal becomes as a piece of wood. Another curious example is afforded by phenol and aniline, both of which are markedly poisonous, but ortho-amido phenol is innocuous.

Another example possesses a special interest from the possible bearing it may have on the causation of uræmic poisoning. This will be discussed later on, but the substance in question is oxalethylin, which has an action like atropine on the brain, pupil, and vagus, stimulating the brain, dilating the pupil, and paralysing the inhibitory powers of the vagus. But if one atom of hydrogen in it be replaced by chlorine, the resulting body, chloroxal ethylin, while still retaining its powers over the vagus, no longer dilates the pupil and acts as a soporific to the brain like morphine.

Methods of Treating the Subject of the Lectures.

The relation between chemical structure and physiological action is a subject which might be treated either from a chemical or from a physiological point of view. Each plan would possess certain advantages and certain disadvantages. A complete treatment of the subject would be easier from the chemical side, and such a method might also be more convenient for reference, but the main object of these lectures is to deal with the subject in relation to the prevention, control, and cure of disease, and the physiological method is, I think, better adapted for this purpose.

I therefore propose to consider the causes of disease and the functions of the organism, and to discuss the manner in which these are affected by alteration in the chemical structure of the remedies we employ.

Nature of Diseases—Microbes and Poisons.

We may regard disease as such an alteration in the body as either causes a want of ease in the patient at the time, or will cause it if its action is not arrested. As I have already said in speaking of the progress of pathology, disease was formerly looked upon as apart from the patient, but now we regard the patient and the disease as living in the same way and influenced by similar conditions.

Ptomaines, etc.—For a good while the microbes were looked upon as directly causing disease by affecting the tissues of the patient, but now, since chemical investigation has been applied to the processes of disease and the products of putrefaction and fermentation, we are beginning to look upon many of the symptoms which occur in consequence of the action of microbes as being due not to their direct action upon the tissues, but to their indirect action in forming poisons; to regard, in fact, the symptoms they produce as bearing a similar relation to the microbes as the symptoms of intoxication do to the yeast plant. This plant, when introduced into the body, does not produce intoxication. It is the alcoholic products of its action upon saccharine fluids which make a man drunk.

Panum's Researches.—In 1856 Panum demonstrated that the poison which occurs in putrefying meat is a

chemical substance and not a living organism, although it may be formed by organisms, for he was able to boil it for eleven hours, and then to dry it completely at boiling heat without destroying its poisonous properties. He showed that the symptoms produced by the putrid poison were different from those produced by various ammoniacal salts—leucine and tyrosine—which he administered to the animals for the purpose of comparison. He was uncertain whether the poison acted like an alkaloid, such as strychnine, directly upon the nervous system, or whether it acted upon the blood, causing decomposition in it and leading to the production of substances which poison the nerve centres. At all events he felt sure that it did not act like an ordinary ferment, such as pepsin or ptyalin, for it was not destroyed like them by prolonged boiling.

Selmi's Researches.—In 1870, Selmi brought prominently forward the chemical nature of the poisonous products which resulted from the decomposition of albuminous matters by microbes. He concluded that their actions might resemble those of the vegetable alkaloids, but he did not separate or identify any individual substance, although he gave the whole class the name of ptomaines.

Cholera and Muscarin Poisoning.—In 1873 I read a paper before the British Association at Bradford, in which I pointed out the striking resemblance which exists between the symptoms of cholera and those of poisoning by muscarin; and I suggested atropine as a possible remedy in cases of cholera, on account of its remarkable power to antagonise muscarin. I came to no conclusion regarding the exact nature of the cholera poison, nor did I distinguish between microbes or actual alkaloids which might be present in it.

Bacteriology and Chemistry.—Since that time the researches of Koch and the methods he has introduced have given an enormous impetus to the study of bacteriology, and the isolation by Nencke of a definite ptomaine, and the discovery of many more by Brieger, has put the chemistry of putrefaction on an entirely new basis.

The Relation of Microbes to Disease.—In discussing the relation of microbes to disease, we may consider, first, the microbes themselves outside the body, and the poisons they may produce; secondly, the microbes themselves, and the poisons they may form in the intestinal canal; and, thirdly, the action of microbes or their products when actually circulating in the blood or present in the tissues. It is, of course, a question not only of great theoretical interest, but one likely to be of great practical importance. Do the microbes break up the albuminous substances or hydro-carbons which they attack, by means of their actual protoplasmic structure, or do they, like the higher animals, secrete organic ferments or enzymes, by means of which the disintegration is actually carried on?

Mode in which Microbes attack Protoplasm.—It is evident that if the decomposition of albumen, starch, or fat, for example, is due to the actual protoplasm of the living microbes, it will at once cease if these microbes be killed, but if it is dependent on a ferment which is secreted by the microbes, it may continue to a certain, though limited, extent after they have been destroyed, just as the pepsin which is secreted by the stomach of a pig may carry on digestion after the pig itself has been killed. This question was investigated by Kühne in 1877. He came to the conclusion that the fermentative action of bacteria was not the same as that of the pancreas, and he did not succeed in isolating any ferment by extracting bacteria with water or glycerine, as he would have done on treating a pancreas.

Microbes and Ferments.—The probability that microbes formed ferments seemed so great, however, that I thought it worth while to take up the question again. The difficulty of such a research, and the time required to make the necessary experiments, completely prevented me from attempting to do it alone, but I have been so fortunate as to secure the co-operation of Dr. Alan Macfadyen, whose skill in experimenting has enabled us to get some positive and interesting results.

The object of the inquiry was to ascertain whether (1) microbes act upon the soil upon which they grow by means of a ferment, and (2) whether such a ferment can be isolated and its action shown apart from the microbes which produce in the same way that the ferments of the stomach and pancreas can be separated from the cells by which they are originally secreted. The results of the inquiry show that bacteria liquefy gelatine by means of an enzyme which can be isolated, and which will continue to act after the microbes have been destroyed. Like the ferments of the pancreas, this enzyme acts most readily in alkaline solutions. Bacteria seem to have the power of adapting themselves to the soil on which they grow, and of manufacturing a ferment suitable to their needs; for the same bacilli, when grown in starch paste instead of on gelatine or in beef-tea, produced a different ferment, which would convert starch into sugar, but would not act upon gelatine.

After we had been occupied with this research for several months we learned that similar results had been obtained by Bitter, who has found that Koch's cholera bacillus produces meat peptone, a peptonising ferment which is quite distinct from the bacillus itself, and continues active after the bacillus itself is destroyed, and similar results have also been obtained by Sternberg. This ferment resembled pancreatin rather than pepsin by acting more vigorously in alkaline than in acid solutions. We have not seen the original work of Bitter and Sternberg, and know it only from a brief abstract.* The difficulty of such investigations is so great that, however carefully the experiments may have been made, there is always a natural hesitation to accept the results of any observers till they have been confirmed by others. At the same time, I believe that the results are substantially correct; and one point that comes out in the experiments is that the microbes themselves may be destroyed by a temperature which does not destroy the activity of the ferment which they have formed.

Relation of the Ferments formed by Microbes to Poisoning by Meat.—The practical application of these results in regard to the prevention of disease is that they seem to show that meat which has become tainted by the presence of putrefactive microbes may possibly be cooked sufficiently to destroy the microbes themselves while the ferments they have formed continue to decompose the meat, and give rise to poisonous substances. We can thus see how a cold beefsteak pie, or other cold meat, may become poisonous and produce serious symptoms, although the same food may have been eaten with impunity immediately after being cooked. For during the process of slowly cooling poisons may have been formed in the meat, although there may have been none in it immediately after it had been removed from the oven, and any microbes present were likely to have been killed by the cooking. The frequency with which meat, very slightly tainted, must be eaten in summer, and the common rule of not eating game at all until it was somewhat "high," as it is termed, makes one rather wonder why poisoning by ptomaines formed in such meat and game does not occur more frequently, although I believe that it occurs, in a slight degree, more frequently than people are generally willing to allow.

* 'Ptomaines and Leucomaines' By Victor C. Vaughan and Frederick G. Novy. Philadelphia: Lea Bros. and Co. 1888. P. 96.

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THE "SAL VOLATILE" CASE.

THE case heard by Mr. VAUGHAN at Bow Street is one that has much interest for chemists, for though the defendant was not a registered chemist, but a Surgeon and Licentiate of the Society of Apothecaries, he kept an open shop, and was in fact carrying on the business of a chemist. It is not therefore remarkable that he should have been generally described in the newspaper reports of the case as a chemist. From the report published in this Journal it will have been seen that the facts upon which the prosecution was instituted were very simple: the preparation sold as sal volatile was not the spiritus ammoniæ aromaticus of the British Pharmacopœia, and therefore, if the assumption could be sustained that this latter preparation must necessarily be supplied whenever sal volatile is asked for, there was a clear breach of the provisions of the Sale of Food and Drugs Act. If under these circumstances there were any possibility of offering a defence it is scarcely possible to imagine one more futile than that which was relied upon, viz., that the preparation supplied was made in accordance with the London Pharmacopœia of 1851. As an answer to the assumption upon which the prosecution was instituted nothing could have been more suicidal, for it gave an opportunity for the statement that on the publication of the British Pharmacopœia in 1867 all other pharmacopœias formerly in use in the kingdom were superseded. The evidence given to that effect by Professor REDWOOD produced a great impression upon the magistrate, and that impression was materially supported by reference to the Medical Act of 1862. In the preamble to that Act it is stated that one of the particular duties for the performance of which the General Medical Council was constituted was the publication of a book containing a list of medicines and compounds, and the manner of preparing them. It is also there set forth that this contemplated Pharmacopœia was intended to supersede those previously in use, and in Section 3 it is specifically provided that for all purposes the British Pharmacopœia shall be deemed to be substituted for the above mentioned pharmacopœias. In the face of these facts it must therefore have appeared to the magistrate as a very lame contention that the article sold as sal volatile had been prepared according to the London Pharmacopœia, especially since the term "sal volatile" stands in the British Pharmacopœia as a synonym for spiritus ammoniæ aromaticus. And it really was a most impotent defence; for if the article was not the sal volatile of the British Pharmacopœia it did not matter whether it was made according to the London Pharmacopœia or by the private formula of JOHN SMITH or anyone else.

But now we come to consider the assumption that the British Pharmacopœia is necessarily the standard for "sal volatile," as that term is commonly understood by the public. Undoubtedly if British Pharmacopœia sal volatile were demanded by a purchaser that assumption must be held to be correct, and it is satisfactory to find that the evidence given at the hearing of the case tends to show that chemists are careful to observe the obligation imposed upon them by the Pharmacy Act in regard to "medicines of the British Pharmacopœia." Both of the registered chemists who gave evidence stated that when asked for sal volatile they would supply the preparation of the British Pharmacopœia, and we have reason to believe that this would be the case generally with pharmaceutical chemists who are careful of their reputation and solicitous to secure the confidence of the public. But chemists are also called upon to supply articles which are not "medicines of the British Pharmacopœia," and with regard to sal volatile, as that term is commonly understood by the public, and even by many medical men, it is well known that a preference is given to the older preparation over the sal volatile of the British Pharmacopœia. It is unnecessary to go into the reasons there may be for this preference and our readers will not require to be assured that it is a fact. What then it may be asked is the utility of attaching to the preparation of the British Pharmacopœia a synonym that is popularly understood to mean something different from that preparation? We confess inability to answer this question. But at the same time we must remind our readers that since the synonym has been attached to the British Pharmacopœia preparation this circumstance must at least be regarded as showing that the popular name may signify the official preparation, and therefore it would not be safe to supply any other kind of sal volatile, even when required to do so, without indicating on the label its particular nature and quality.

If there were any defence to the prosecution instituted by the St. Giles's Board of Works it should have been so conducted as to raise the question whether sal volatile is necessarily a "medicine of the British Pharmacopœia" and nothing else. It should have been shown that though the article sold

under that name was not a pharmacopœia preparation at all, it was one held in popular appreciation, and very frequently preferred by those who are in the habit of using it. From the evidence given by Mr. WATTS and Mr. WHITE it is clear that there is still a large demand for this preparation even by medical men, and although Mr. VAUGHAN expressed astonishment at Mr. WATTS's statement that he did not know that by the Act of Parliament the British Pharmacopœia alone was to be followed, his astonishment can only be ascribed to the injudicious manner in which the defence was put before him. The only point that could have been useful in supporting the argument that no offence under the Food and Drugs Act had been committed was studiously ignored, and reliance was placed on a perfectly untenable contention. In that way the provisions of the Medical Act came to appear as having a scope much wider than that which they really have as relating only to medicines of the British Pharmacopœia but not to popular domestic remedies. It is in this respect that there seems to be reason for fearing that the introduction of synonyms into the Pharmacopœia may in some cases be mischievous rather than beneficial. It would be undoubtedly open to objection if "chlorodyne" were made a synonym of "tinctura chloroformi comp." Nothing can be urged against the introduction of "laudanum" and "paregoric," as synonyms, since the potency of the preparations they represent demands uniformity. But "sal volatile" itself seems open to question; it is neither a scientific nor a rational synonym for "spiritus ammoniæ aromaticus." The term signifies carbonate of ammonia, only one ingredient of the preparation to which it is applied. It is, indeed, merely a popular abbreviation of "spirit of sal volatile," and the preparation thus known is quite different in strength, flavour and character from that of the British Pharmacopœia. However, we think that even purists may be satisfied by the evidence that has been furnished of a desire on the part of pharmacists to assist in securing the uniformity of medicinal preparations.

The question has been asked whether the sale of methylated spirit by retail would be held incompatible with the holding of a license for a still kept for pharmaceutical purposes. So far as we have been able to ascertain, this is a matter in which it appears to be necessary for the Excise authorities to exercise some discretion. In the case of a chemist having a still in a place apart from the premises in which he stored and sold methylated spirit he would not be interfered with; but otherwise he might be. It is therefore necessary to bear in mind this requirement. The practice with the Revenue authorities appears to be to deal with every case of this nature on its merits. That is considered by them to be necessary in order to guard against risk to the revenue. For that purpose the local officer would have to make an official inspection so as to become intimately acquainted with the premises and work of the chemist who requires a license for selling methylated spirit by retail and a licence for keeping a still. But we have reason to believe that when the above-mentioned conditions are observed there would be no difficulty in obtaining both licenses.

* * *

In the report of the Pharmacopœia Committee presented to the General Medical Council last week it was stated that 27,460 copies of the last edition of the Pharmacopœia had been sold, and that, taking into account the value of copies in stock, the balance in favour of the Council over expenditure in producing the edition was estimated at £1362. A vacancy in the Pharmacopœia Committee caused by the retirement of Dr. Aquilla Smith, was filled up by the appointment of Dr. Lombe Atthill, who has succeeded him as the representative of the Kings and Queens College of Physicians on the Council.

* * *

The honorary degree of M.A. of the University of Oxford has been conferred upon Mr. George Claridge Druce, one of the examiners of the Pharmaceutical Society of Great Britain.

* * *

We learn from Birmingham that all the leading chemists in the suburbs of Small Heath and Sparkbrook have agreed to close their establishments from 2 p.m. till 6 p.m. on Wednesdays during the summer months, and it is to be hoped that the chemists in other neighbourhoods will follow this good example.

* * *

The annual general meeting of the members of the Society of Chemical Industry has been fixed for the 10th, 11th, and 12th of July next. The meeting will be in London and the programme that has been issued presents features of attraction which will compare favourably with any of the preceding meetings. On Wednesday the 10th the annual meeting will be held in the theatre of the Royal Institution, Albemarle Street, at 11 a.m. with the President, Mr. Ludwig Mond, in the chair. After the report of the Council has been read, and the other usual business transacted, the President will deliver an address, and at the conclusion of the meeting the laboratories and historic collections of the Royal Institution will be open to the inspection of members of the Society. At 2 p.m. the pottery show rooms of Messrs. Doulton and Co. on the Albert Embankment will be open to the members, and luncheon will be provided by the Company, after which the studios and other works will be visited. In the evening there will be a reception by the President at 9 p.m. at the Grosvenor Gallery, Bond Street. On Thursday the members will be conveyed by steamer to the Manbré Saccharine Company's works, and after inspecting them the steamer will proceed to Kew Gardens, where the Director, Mr. Thiselton Dyer, will arrange for conducting the party over the Gardens and Museums. The annual dinner of the Society will take place at the Star and Garter Hotel, Richmond, on Thursday evening, and on Friday opportunities will be afforded for visiting Truman and Hanbury's Brewery, Cowan and Sons' Sugar Refinery, the A. B. C. Sewage Works, and Groth's Electric Tannery, as well as the works of Brin's Oxygen Company and those of the Brush Electric Light and Engineering Company. A detailed programme of the arrangements can be obtained by application to the Honorary London Secretary, Palace Chambers, Westminster.

Transactions of the Pharmaceutical Society.

EXECUTIVE OF NORTH BRITISH BRANCH.—NOMINATIONS FOR ELECTION.

The following is a list of persons who have been nominated for election as members of the Executive of the North British Branch, and have expressed their willingness to serve if elected:—

*1. Boa, Peter, 119, George Street, Edinburgh.
2. Coull, George, 17, Smith's Place, Leith Walk, Edinburgh.
*3. Fisher, John Hutchison, 66, High Street, Dunfermline.
*4. Frazer, Daniel, 127, Buchanan Street, Glasgow.
*5. Gibson, Adam, Thistle Street Lane, East, Edinburgh.
*6. Gilmour, William, 11, Elm Row, Edinburgh.
*7. Hardie, James Millar, 68, High Street, Dundee.
8. Jamieson, Simpson, 9, Crossgate, Cupar, Fife.
9. Kerr, Charles, 56, Nethergate, Dundee.
*10. Kinninmont, Alexander, 69, South Portland Street, Glasgow.
*11. Lawrence, Samuel, 101, George Street, Oban.
*12. Maben, Thomas, 5, Oliver Place, Hawick.
13. M'Adam, Robert, 34, Virginia Street, Glasgow.
*14. Mackenzie, James, 45, Forrest Road, Edinburgh.
*15. Nesbit, John, 162, High Street, Portobello.
*16. Paterson, James, 15, Regent Quay, Aberdeen.
*17. Stephenson, John Bertram, 48, Frederick Street, Edinburgh.
*18. Storrar, David, 228, High Street, Kirkcaldy.
*19. Strachan, Alexander, 138, Rosemount Place, Aberdeen.
20. Thompson, Thomas, 35, George Street, Edinburgh.
21. Thomson, Isaac William, 4, Bellevue Street, Edinburgh.

The voting papers are to be returned by those to whom they have been sent by Tuesday, June 18, and the result of the election will be declared at a meeting of the Members and Associates in Business of the Society, to be held at 36, York Place, Edinburgh, on Wednesday, June 19, at twelve noon precisely.

* Those marked with an asterisk are members of the retiring Executive, but are eligible for re-election.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

On Wednesday, the 5th instant, the stated monthly meeting of the Council of this Society was held at their rooms, No. 11, Harcourt Street, Dublin, at three o'clock. The following members were present:—Messrs. Baxter, Merrin, M. I. D'Arcy, McCormack, Professor Tichborne, Allen, M. R. Whitla, W. I. Wells, junr., Hayes, Beggs and Doran.

Mr. Allen: Gentlemen, I propose that Mr. Hayes take the chair.

Mr. Baxter: I propose that Professor Tichborne take the chair. He is an Ex-President.

Mr. Merrin seconded the motion.

Professor Tichborne: Mr. Hayes having been proposed first I would rather not take the chair.

There being no seconder to Mr. Hayes, and Mr. Baxter's motion being seconded,

Professor Tichborne took the chair and said: Gentlemen, I think it would clear the ground very much if I were to say one or two words. We are met here under very peculiar circumstances, and I think that we should avoid all burning questions and strictly confine ourselves to disposing of the business on the paper. That, I think, will commend itself to the common sense of all present. Now, Mr. Ferrall, please read the minutes of the last meeting.

Mr. Ferrall, the Registrar, read the minutes of the last monthly meeting and of the two special meetings. The minutes of the last special meeting recorded the withdrawal of five members of the Council, and that the President and Vice-President afterwards resigned.

Mr. Wells said: Before you sign the minutes of the last meeting I wish to point out that a certain amount of information is given in them respecting matters that did not take place at a meeting of the Council. I should like to know why anything that took place after the meeting was broken up should be reported in the minutes.

Mr. Hayes: The meeting did not break up.

Mr. Wells: There was not a quorum present. There were only six in the room.

Mr. Hayes: Attention was not drawn to that.

Mr. McCormack: Regulation No. 3 says that no business shall be transacted at any meeting of the Council unless seven members are present.

Mr. Allen: No business was transacted.

Mr. Hayes: The business there spoken of was done, but without knowing that we had not a quorum. We were not aware that we had not a quorum until after we had broken up.

Mr. Wells: Where is it stated that somebody must object?

Mr. Hayes: It is the rule of the House of Commons.

Mr. Wells: Our rule states that unless a certain number of members are present no business shall be transacted.

The Chairman: I am rather inclined to think that the matter referred to should not have gone on the minutes. The minutes are of course only an account of the business done at the Council. Whether, however, the matter is of sufficient importance for the question to be raised I do not know.

Mr. Hayes: We had seven members there.

Mr. Wells: You had not seven members present at the latter part of the proceedings.

The Chairman: If any gentleman objects, I think I must have the minutes amended. But I think you had better let them remain as they are. (To the Registrar) Who drew up these minutes, Mr. Ferrall?

Mr. Ferrall: I did, sir.

The Chairman: Well, now, gentlemen, I am in your hands. If any member of the Council requires it, I will order the minutes to be amended.

Mr. Doran: I do not see that it is material one way or the other.

Mr. Wells: Having drawn attention to the informality, I shall not press my objection further.

The minutes were then signed.

The Chairman: The first business on the paper is the election of two members of the Council in the room of Messrs. Brunker and Draper resigned. What about their resignations?

Mr. Ferrall: They were given in at the last meeting, and are recorded in the minutes.

Mr. Wells: Are there no letters from them resigning their positions?

Mr. Ferrall: No. The only official intimation is the record in the minutes.

The Chairman: It is hardly courteous, I think, to treat the Council in this way.

Mr. Wells: It is usual for any gentleman resigning to send a letter to the Registrar saying so.

The Chairman: Are there no letters resigning their positions on the Council either?

Mr. Ferrall: No, sir.

The Chairman: Is there anything on which we can act?

Mr. Ferrall: They have sent sealed packets containing their six keys—one from Mr. Brunker addressed to the "President," and the other from Mr. Draper, addressed to the "Vice-President."

Mr. Hayes: They resigned publicly. We asked them to reconsider their decisions, and they said distinctly that they could not.

The Chairman: It might have been done in the heat of the moment.

Mr. Doran: Is it necessary that they should send written resignations?

The Chairman: There is no law on the subject save etiquette.

Mr. Wells: The point is that they did not resign at a meeting of the Council.

Mr. Ferrall: Here is the letter from Mr. Brunker, which I received a few minutes ago:—"Medical Hall, 68, Grafton Street, June 5, 1889. Dear Sir, Herewith I send under seal, addressed to the President, the key which I held while filling that position. Yours faithfully, J. E. BRUNKER. A. T. Ferrall, Esq." The letter from Mr. Draper is as follows:—June 3, 1889. Dear Mr. Ferrall, I enclose herewith a sealed envelope containing the duplicate key of the Society's seal, which I shall feel obliged if you will be good enough to hand to the incoming Vice-President. I am, dear Mr. Ferrall, yours faithfully, HARRY NAPIER DRAPER. A. T. Ferrall, Esq."

The Chairman: Gentlemen, as far as I can see there are two modes in which you can meet this. Of course, before I say anything on the question I would like to have your opinions as to whether you feel inclined to proceed to the election of a President and Vice-President.

Mr. Hayes: The first item on the paper is the election of two members of the Council in the room of the gentlemen who have retired.

Mr. Doran: The wisest thing to do would be officially from the Council to ask the late President and Vice-President to reconsider their determinations before you do anything further, more particularly as they have not sent in any written resignations. What they did here in the heat of the moment might probably be got over. I think it would be a great pity to lose the services of two gentlemen who have done so much for the Society. I myself have not been in favour of a good many things in the proposed Bill, but I overruled my own feelings for the sake of the public good.

The Chairman: Does anyone second that?

There was no response.

The Chairman: If there be no seconder to the proposal of course we must pass on to the election or postpone it to the next meeting.

Mr. Allen: I think the vacancy on the Council must be filled up within ten days.

The Chairman: When will the ten days be up?

Mr. Ferrall: To-morrow.

The Chairman: From when do they count?

Mr. Ferrall: From the date of the meeting.

The Chairman: If I thought the matter was going to take this phase I should not have advised you to accept the minutes. It leads to unpleasant complications.

Mr. Ferrall: I must set myself right, as well as the late President and Vice-President. There has been no arrangement as to the minutes. I took them down as I believe quite correctly.

The Chairman: Oh, yes, quite so. If you take it from the last meeting, when will the ten days be up? What was the date of the last meeting—I was not here?

Mr. Ferrall: Monday, May 27.

Mr. Merrin: Is there any objection to taking the election of Dr. Gordon as a member of the Society first?

Mr. Allen: I think we have a regulation that the business must be proceeded with in the order in which it appears on the agenda paper.

Mr. Wells: Would it be out of order to move that the first matters on the paper be postponed until the other business is done?

Mr. Merrin: I second that.

A motion of Mr. Wells that the standing orders be suspended and that article 5 on the paper be first disposed of, was seconded by Mr. Merrin, and agreed to unanimously.

Dr. Alexander Gordon, of Ranelagh Road, Dublin, was then elected a member of the Society.

Mr. Merrin: I have great pleasure in moving that Dr. Gordon be elected a member of the Council. It is unnecessary for me to say anything as to his many qualifications. I am sure he will be an invaluable member of the Council.

Mr. Beggs: I have great pleasure in seconding the motion.

Carried unanimously.

Mr. Whitla: I propose that Mr. J. C. Payne be elected a member of the Council. It is not necessary for me to make any remarks as to his fitness, for he has already sat on the Council, and he is a gentleman in whom I am sure we all have confidence.

Mr. Wells: I have great pleasure in seconding the motion, because I know that Mr. Payne has rendered services to the Society which have certainly not been surpassed by those of any other member of the Council. He was faithful year after year to the trust reposed in him by the licentiates, and was a very great loss when he left the Council. We require a representative here from places like Belfast.

Mr. Allen: Has he signified his willingness to come on the Council?

The Chairman: I know no country member who is more active than Mr. Payne, and if he is willing to come on the Council all the members will be delighted to see him. I cannot agree with him in everything; but I should like to see good men on the Council.

The motion for the election of Mr. Payne was unanimously carried.

The Chairman: Now you have the elections of President and Vice-President, and I shall take the former first. All I have to say about the matter is that I do hope we shall have a President who will be prepared quietly to go on with the business of the Society, and to try to bring it out of the little difficulty into which it has been landed. No doubt there has been some little embarrassment created; however, the prospects of the Society are perfectly safe. There has been a lot of tall talk and loud talk in the heat of the moment, which I think would have been better left unsaid. We will not go back on it. As regards the Society, when the late Sir Dominic Corrigan and I left it we left it in a very good financial position with £400 funded money. Though we have been under great expense from circumstances, and although a large quantity of that money has gone, still it enabled us to pay our way. As far as my recollection serves me—our Treasurer not being here—I believe that at the last meeting we were quite solvent, and that our ordinary legitimate expenses did not exceed our income. I am not speaking of extraordinary expenses. We shall have to sell out funds, no doubt, in order to pay those extraordinary expenses. But I believe that the Society is able to pay its way; and there is no doubt that every year the roll of its membership will increase, though it may do so slowly. All we want is a little calm and a little peace. As regards the danger of a Bill, of course we are done with the one recently promoted for this year; and as to any danger of a Bill being brought in by the chemists and

druggists, you need not have the slightest fear about that for twelve months. I know that a good many very sensible and clever men are connected with the movement on the opposite side, and I do not believe that they will do anything rash or foolish. Probably by this time twelvemonths both sides may see their way to arrange matters in a manner that will be satisfactory to everybody. I certainly saw two or three things in the late Bill that I did not like at all. However, the important question now is to get a President who will be prepared to nurse the Society until it gets into smooth water.

Mr. Beggs moved that the election of President and Vice-President be postponed to the next monthly meeting.

Mr. McCormack seconded the motion. No doubt they had rather a good meeting at present, and it was no joke to be asking the country members of the Council to be at the expense of constantly coming up to town.

Mr. Beggs: That was my objection to having three meetings in one month. I considered that it was most unfair to our country members.

Mr. Wells: I support the motion. It is really only a few days since we got notice of what is before us, and there has been very little time to consider our position and try to get some one to take the office of President.

Mr. Baxter: As a young member of the Council I scarcely like to intrude my views, but if we could prevail on our worthy Ex-President, Dr. Tichborne, to take again the office which he so worthily filled for many years, I think it would meet the wishes of all the members of the Council.

The Chairman: I am very much obliged to you for the compliment, but I must emphatically say "No," for many reasons. In the first place, I myself was the introducer of the law by which the members of the Council are supposed to take the office of President in turn. I served for three years. Another reason is that I could not possibly give the time that will be necessary for the carrying on of the Society next year, and there is no doubt that it will require a great deal of attention. At the same time any assistance that I can give will be given. I took the chair with pleasure to-day, as there seemed to be a little difficulty about it, simply in order to help the Society and do away with the impression that it was in any such difficulty. I do not forget that this Society had the most prosperous career that any young Society could have had, chiefly, no doubt, owing to the great influence of Sir Dominic Corrigan; and nothing could have exceeded its prosperity at the expiration of my term of office. Circumstances have changed all that; still I do not believe that you have the slightest difficulty before you. Unfortunately, however, I cannot take the helm, nor would it be right that I should do so; it would be in fact and in spirit an infringement of your law. I know that in spirit it has been infringed during the last seven years; but that is no matter now. There are plenty of good men. I should strongly advise you to elect a country member for your Vice-President; but a town man should be President of the Society. I shall only fill the blank in the interval and make myself as useful as I can. You have very good men in Mr. Charles Evans, Mr. Wells and Mr. Hayes, and there is Mr. Simpson too. In fact there are so many good men that the difficulty is whom to choose. I would also advise you to select a man who has a pharmacy establishment of his own open.

Mr. Whitla: I wish to say a few words as to the election of President. I know the opinions, sir, of a good many members of the Board, regarding your fitness for office; and we were anything but pleased when we heard that you would not accept it. The feeling is that we want some one having experience such as you have had as President, in order to steer the Society through the present crisis. But my reason for rising to speak was this. Allusion has been made to the fitness of proceeding with the election of President at this meeting, because it is fairly representative of the country members. As a country member, I waive my feelings on the point, and am willing to let the election stand adjourned, because the question is a very important one which requires consideration. I shall be very happy to attend any future meeting of the Council at which the election of President may take place, although it is not an easy matter for me to come to town. As a country member, I would be agreeable to having the election postponed for another month.

Mr. Hayes: There is another matter which it may be well to consider. Your examinations come on next month, and the arrangements for them should be made. It would be a serious matter to be without a President for a month.

Mr. Ferrall read Clause 7 of the Pharmacy Act relating to the filling up of vacancies caused by the resignation of the President and Vice-President.

The Chairman: It does not prescribe any time.

Mr. Wells: You need not elect sooner than the next annual meeting if necessary.

A motion of Mr. Beggs, seconded by Mr. McCormack, that the election of President and Vice-President be deferred until the next monthly meeting, was then put, and almost unanimously carried, there being only one "no."

A letter was read from the Editor of the *British and Colonial Druggist*, 21, New Bridge Street, London, asking, would the Council admit the Dublin reporter of that paper to the monthly meetings of the Council. The writer said:—"It would be understood that anything transpiring in committee would not be reported, in accordance with the practice followed in the case of the London Council; but in order to prevent misconception, I have to add that our reports of those proceedings which the Council allowed to be made public would not be subject to any official revision."

The Chairman: I think the time has come when we should drop any invidious distinctions as regards the press, and place the *British and Colonial Druggist* on the same footing as the *Chemist and Druggist* and the *Pharmaceutical Journal*. In other words, our official reports should be sent to all those papers.

On the motion of Mr. Baxter, seconded by Mr. Whitla, it was resolved:—"That Mr. Macartney, our reporter, be at liberty to supply the *British and Colonial Druggist* with the usual report of the proceedings."

A letter was read from Mr. Martin R. Nugent, of 11, Sarsfield Street, Limerick, enclosing an affidavit.

On the motion of Mr. Hayes, seconded by Mr. Allen, it was resolved that the name of Mr. Martin R. Nugent be placed upon the Preliminary Register.

A letter addressed by Sir James Haslett to the late President of the Society, Mr. Brunker, asking what were the prospects of future legislation, was read by Mr. Ferrall.

The Chairman: This seems a private letter to Mr. J E. Brunker. It is not addressed to him as President of the Society. I should like to hear some remarks on this letter. There is no chance of legislation this year, and I think I should simply state that that is your view.

Mr. Wells: I think it would be perfectly useless to attempt to go on. It would be only throwing away money, and we should not be acting honestly towards the gentlemen in the north if we appeared even to go on with a Bill, for it has been shown that there will be opposition on all sides. Therefore, for the present, I think that the Council ought to take no steps.

The Chairman: Yes, that is my view. It is too late now to do anything this year.

Mr. Wells: The English Bill was introduced very early this year, and yet it has been put back.

The Chairman: Of course, if we can see our way to do anything in the meantime, it can be done. A great number of members of the Council would like to see the question settled one way or another.

Mr. Whitla: Taking a retrospective view of events I do not see that we can come to any other conclusion than to abandon the Bill at present. I believe that in the face of all that has taken place that is the proper and conscientious course for the Council to pursue. I do not see how we could hope to get a contested Bill passed this session. I have been authorized to state here to-day that the opposition to the Bill which has just been allowed to lapse—if I may say so—is growing, and that there is a feeling amongst the members of the Society and the licentiates that it should not be allowed to pass in its present form. Two members of the Society have spoken their minds to me on the subject, and it is my own opinion with respect to the Bill also. One gentleman went so far as to say that he would subscribe £5 or £10 to the opposition for the purpose of getting the Bill blocked, for he believed that it did not properly safeguard the interests of the members and licentiates of the Society. I move that the Registrar be instructed to communicate to Sir James Haslett that the Council are of opinion that there is no hope of passing any Bill this session, and that the matter should stand over until next year.

Mr. Merrin: I second that. I am glad Mr. Whitla has made the statement he has done, because it bears out what Mr. Wells said at the last special meeting.

Mr. Hayes: I may say with regard to what has just dropped from the gentlemen who have proposed and seconded the resolution that I do not think it was contemplated by any of the members of this Council who took part in the promotion of that Bill that it should pass this year. In fact, Sir James Haslett himself, at the conference here, said he thought it an impossibility that the Bill could be got through Parliament this year, even though it should be entirely unopposed. I think the wish of all, or at least of the majority, of the Council, was that the Bill should be carried out as far as possible in accordance with the arrangement made at the conference held between the chemists and druggists and the members of the Law Committee. With that object the Bill was drafted, and it was contrary to the wishes of the majority of the Council that they should go back on what had been arranged. I felt keenly the action taken by a section of this Council at the last meeting, as I considered it to be a breach of faith.

The Chairman: Excuse me for one moment. We have been getting on very well at this meeting, and why should this matter be introduced?

Mr. Hayes: I am simply putting a few facts before you.

Mr. Wells: Of course if this goes on you will allow me to claim the privilege of a reply.

The Chairman: Allow me to appeal to you, Mr. Hayes.

Mr. Hayes: I am doing this not to raise any controversy, but for the purpose of trying to smooth matters down.

Mr. Wells: You have gone a very bad way about it by making charges that are perfectly untrue.

The Chairman: Well now, we had better not go into the merits of the Bill or the demerits of it. The question is, is there any chance of legislation at present, and if not what answer shall we give to Sir James Haslett? I do not think we should discuss the Bill at all.

Mr. Hayes: What we concluded to do was that the Bill should be put into such a shape that it could be brought in next session. I have received a letter from a gentleman in the country who gives a pitiable description of the state of things in his town.

The Chairman: Are you going to move that we should consider the subject of legislation? The last time I appeared at this Council I was not allowed to read even a letter from a member of the Council; and I do not think you should introduce a letter from a gentleman who is not a member.

Mr. Hayes: I only say that the letter gives a pitiable account of the condition of matters in an important country town, and it shows the desirability of legislation. Otherwise, the whole matter of pharmacy will get into a state of irreparable chaos. Therefore we ought if possible to meet the members of the Chemists' and Druggists' Society, and promote a Bill that we mutually agree on.

The Chairman: I hope we shall soon be in that position—very likely we shall; but I do not think we need discuss it at this stage.

Mr. Wells: After what Mr. Hayes has said, I certainly claim the right to reply. I came here to-day with the view of putting everything that has passed behind backs. I felt very keenly the language that was used by Mr. Hayes and other gentlemen the other day. There is one matter which I wish to refer to. Mr. Hayes has come again to-day, and made a statement which I say is totally incorrect. I do not wish to say anything against a gentleman who is not present. I have tried to think that other gentlemen have an honest purpose in view, and I would be very sorry to say a word against my opponents. I take them to be honest men, and let them give us credit for honestly voting for the cause that we believe to be just. I have in my pocket several letters from licentiates of the Society, saying that they were very pleased with the action that we took on the last day; and I can bear out what Mr. Whitla has said. I have letters in my pocket saying that opposition is being started in the south and in the north; and I have a circular in my pocket showing that opposition is to be started in Dublin. Mr. Brunker is represented in the reports in the journals as having said:—"The representatives of both sides appeared to be agreed; and some of the gentlemen who represented the extreme party on one side did not fight their corner as they appear to be able to do in the absence of the enemy." I say a more unfounded statement could not be put in print than that is. I think we have been very unfairly treated by Mr. Brunker and Mr. Hayes in that respect.

The Chairman: Well now, will you oblige me—as I have taken the chair under very peculiar circumstances—by dropping this controversy.

Mr. Wells: Allow me to state what took place. Before we went into that conference we were told that nothing that was said was to be binding upon either party. We begged of them not to argue for too much. We went in with that view. The President, Mr. Hayes and the Vice-President very ably fought their corner about the educational test. Mr. Brunker said that personally he was in favour of it, and that it would be very hard to give it up. Mr. Hayes and the Vice-President said they were very strong on it, and urged it very ably upon their opponents. Mr. Hayes said they would not give it up. Is it fair then to say that we did not fight that point? I say the statement that the point was not fought as if the enemy was absent is neither fair nor just.

Mr. Hayes: Excuse me, I did not say anything of the kind. I simply said that we went back from what we had arranged at the conference.

The Chairman: Well now, let us put an end to this controversy. It is not the subject before the chair. I rule that the question before the chair is—are you going on with the Bill or not immediately? If you are not I think you have simply to state that fact to Sir James Haslett. If you think you should go on with the Bill it would be necessary to call another

meeting and adjourn any elaborate discussion until then. I know you have not a chance of doing anything this year, and therefore I think it would be a most injudicious thing to raise the question at all, directly or indirectly; at any rate for a month or so to come, until you have settled down and got your President and Vice-President appointed; and then any member who thinks it desirable to bring the subject forward can do so.

Mr. Baxter: It comes to this, that we must come to terms at some time or other, or the Society will be put in a false position.

The Chairman: Let us calm down.

Mr. Hayes: Well, gentlemen, I think you should consider the subject of legislation, for you will have to give up more and more each year that you put it off.

Mr. Wells: The answer to give to that, Mr. Chairman, is that we shall stop as we are, please goodness.

On the motion of Mr. Whitla, seconded by Mr. Merrin, the following resolution was then passed *nem con.*: "That in the opinion of the Council it is desirable to postpone until next year the consideration of the proposed Pharmacy Bill, owing to the parliamentary session being so far advanced."

The next business was the election of two members to serve on a General Committee to be formed for organizing an International Congress of Hygiene and Statistics in London in 1891.

On the motion of Mr. Wells, seconded by Mr. Beggs, Professor Tichborne and Dr. Whitla were nominated.

The following gentlemen were nominated for membership of the Society:—Messrs. Samuel R. Henry, L.P.S.I., of The Diamond, Monaghan; John McClelland, L.P.S.I., Medical Hall, Ballymena; and Thomas M. O'Connor, L.P.S.I., Medical Hall, Dungarvan.

The Council then adjourned.

Proceedings of Societies in London.

CHEMICAL SOCIETY.

A meeting of the Chemical Society was held on Thursday, May 2, Dr. W. J. Russell, F.R.S., President, in the chair.

The following papers were read:—

Thiophosphoryl Fluoride. By T. E. Thorpe, F.R.S., and J. W. Rodger.

The Boiling Point of Sodium and Potassium. By E. P. Perman.—Sodium and potassium were boiled in a hollow iron ball, which was heated by means of a blowpipe; the temperature was found in each case by means of an air thermometer, consisting of a glass bulb with a capillary stem which was lowered into the vapour, sealed, and broken open under water. The mean result for sodium was 742°, and for potassium 667°.

Note on the Heat of Neutralization of Sulphuric Acid. By S. U. Pickering.

α-ω-Diacetylpentane and α-ω-Dibenzoylpentane. By F. Stanley Kipping, Ph.D., D.Sc., and W. H. Perkin, Junr., Ph.D.

Acetopropyl- and Acetobutyl-Alcohol. By Harold G. Colman, M.Sc., Ph.D., and W. H. Perkin, Junr.

A meeting of the Chemical Society was held on Thursday, May 16, Dr. W. J. Russell, F.R.S., President, in the chair. Several certificates were read for the first time, and there was an election of Fellows of the Society.

The following papers were read:—

The Magnetic Rotation of Nitrogen Compounds. By W. H. Perkin, Ph.D., F.R.S.—In previous communications the author has shown that in the magnetic field the plane of polarization of light is rotated to a greater extent in unsaturated than in saturated carbon compounds; in the present communication it is shown that in the case of nitrogen compounds the magnetic rotation is in like manner correlated with changes in the valency of the nitrogen. *Nitrates, nitrites and nitro-compounds.*—The specific rotation of all these is low, thus:—

Nitric acid	1·180
Methylic nitrate	2·057
Ethylic ,,	3·084
Propylic ,,	4·085
Isobutylic ,,	5·180
Ethylenic ,,	3·768
Glyceric ,, (nitro-glycerin)	5·405
Isobutylic nitrite	5·510
Nitromethane	1·858
Nitroethane	2·837
Chloropicrin	5·384

The change attending the conversion of nitric acid into an ethereal salt is comparable with that of the acids of the acetic series into ethereal salts, the increase in the value for the nitrate being less than may be expected from the change in composition; thus:—

Methylic nitrate	2·057	Methylic formate	2·495
Nitric acid	1·180	Formic acid	1·671
	0·877		0·824

Usual value of CH_2 1·023

The high rotation of isobutylic nitrite in comparison with that of the corresponding nitrate is an illustration of the influence exercised by unsaturated nitrogen; it is also noteworthy that the rotation of chloropicrin is less than that of chloroform (5·559). *Amines.*—Very nearly the same value is obtained for ammonia, whether aqueous or alcoholic solutions be taken, the former giving 1·81, the latter 1·826; the aqueous solution examined contained 31 per cent., the alcoholic 14·48 per cent. NH_3; hence it would appear that little, if any, combination takes place between the ammonia and the solvent. Similar observations made with mixtures of equal volumes of isobutylamine and water or alcohol, and with a mixture of piperidine and water in the proportions $C_5H_{11}N : OH_2$, indicate, however, that combination takes place to some extent in these cases, the found and calculated values being as follows:—

	Calculated.	Found.	Difference.
Isobutylamine and water	11·200	11·099	0·101
,, and alcohol	10·459	10·361	0·098
Piperidine and water	6·810	6·724	0·086

The effect of hydrocarbon radicles on amines was studied in the following cases:—

Ethylamine.	3·609
Diethylamine	5·662
Triethylamine	8·518
Propylamine	4·563
Dipropylamine	7·549
Tripropylamine	11·664
Isobutylamine.	5·692
Diisobutylamine	9·936
Allylamine	5·587
Pentamethylenediamine	7·491
Aniline	16·162
Methylaniline	19·629
Dimethylaniline	22·823
Piperidine	5·810
Pyridine	8·761

From these numbers it will be seen that the effect of introducing a single radicle into ammonia is somewhat less than corresponds to a similar change in homologous series, viz., 1·023 per CH_2. The rotation is increased proportionally more by the displacement of a second hydrogen atom, and in the paraffinoid amines a very remarkable increase attends the introduction of the third radicle, indicating a marked difference to exist between secondary and tertiary amines. The effect of methyl in aniline is also very remarkable, the increase in the rotation being more than

three times that which usually follows such an alteration in empirical composition in paraffinoid compounds. The value for piperidine is very low, and is in accordance with the conclusion that it is a saturated compound; the value for pyridine is also low in comparison with analine and benzene (11·297). The study of the salts of the amines has afforded noteworthy results; instead of the diminution which usually attends the formation of compounds, it is found that the observed rotation is slightly in excess of that calculated by adding the rotations of the constituent compounds in the case of the following ammonium chlorides:—

	Found.	Calculated.	Difference.
Ammonium chloride . . .	6·096	6·032	+0·064
Ethylammonium chloride .	7·997	7·823	+0·174
Diethylammonium chloride	9·896	9·876	+0 020
Piperidinium.	10·034	10·024	+0·010

Triethylamine, however, behaves normally, and a normal result is also obtained in the case of ammonium nitrate and sulphate, thus:—

	Found.	Calculated.	Difference.
Triethylammonium chloride	11·724	12·732	—1·008
Ammonium nitrite	2·316	2·998	—0·686
„ sulphate . . .	4·963	5·951	—0·988

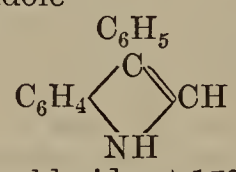
From the discussion of his results generally, the author arrives at the conclusion that in compounds of unsaturated "triad" nitrogen, the nitrogen has a greater influence than when it is present in the saturated condition, the difference in the values being about 0·5; this is only about half the difference usually observed on comparing the rotations of carbon compounds differing by 2H.

The Nature of Solutions, as elucidated by a study of their Densities, Electric Conductivities, Heat Capacity and Heat of Dissolution. By S. U. PICKERING.—The solutions which form the subjects of this research are those of calcium chloride, calcium nitrate, and sulphuric acid. The results obtained from the first of these have already been brought before the Society (Proc., 1888, 35), and tended to show that the curves representing the densities and heat of dissolution of solutions of different strengths, though apparently regular on a superficial inspection, are not really so; when they are analysed by differentiation they are resolved into a series of curves or straight lines, showing that breaks occur in the original curves, these breaks, moreover, correspond to hydrates of definite composition. The densities gave a series of straight lines, on the first differentiation, bearing out Mendeleef's statement that such was the nature of the density curves in the case of sulphuric acid and alcohol, whereas the heat of dissolution required two differentiations before it gave straight lines. With calcium nitrate the determinations which have been made are much more numerous, and the results obtained are of a nature precisely similar to those with calcium chloride. The straight lines formed by the first differential coefficient of the densities are in this case inclined to each other so very slightly as scarcely to warrant the conclusion that the whole figure is not a continuous curve, were it not that the heat results confirm in every detail the breaks which the rectilineal drawing of the density differential shows. The heat capacities (specific heat) of very weak solutions of this salt have also been determined, and they are found to afford a rectilineal figure indicating breaks at the same points as those deduced from the density and heat results. The author has proceeded to an extensive examination of sulphuric acid solutions. On plotting out the first differential of his density results, he was surprised to find that it formed an irregularly curved figure, and not the rectilineal figure given by Mendeleef, and he was still more surprised to find that on plotting out the values used by Mendeleef himself, the figure obtained was curvilinear like his own, and not rectilinear like Mendeleef's. This led him to plot out Mendeleef's values for the first differential of the densities of alcohol, and in this case also he found that they gave an irregular curve, and not the rectilineal figure depicted by Mendeleef. Mendeleef's statement, therefore, that he had proved the hydrate theory by showing that the densities differentiated into straight lines meeting at points corresponding to definite hydrates is erroneous. On applying a second differentiation to his density results with sulphuric acid the author obtained a series of straight lines, so that the density curve in this case resembles the heat curves in the case of the two calcium salts, and it is probable that the densities of these latter salts give rectilineal figures on the first differentiation only, because the constituent lines are straight within experimental error, and not because they are straight in reality. The author has made determinations with a series of sulphuric acid solutions at four different temperatures, 8°, 18°, 28° and 38°. The results obtained and the breaks shown were the same in every case, and the latter were found to become more apparent as the temperature is lower. The same conclusions as to the effect of a lowering of temperature in intensifying the change in general direction of the curve may be drawn from Mendeleef's determinations with alcohol at different temperatures. Crompton's interpretation of Kohlrausch's determination of the electric conductivity of sulphuric acid solutions is next discussed. The author agrees with Crompton's conclusions that they give a rectilineal figure after two differentiations, but he differs from him in some of the details as to where the breaks occur, and shows that the most probable position of these breaks agree very closely with those shown by his own density results. The heat capacity of sulphuric acid solutions up to a strength of 12 per cent. was next determined, and the results were found to form a series of very slightly curved lines indicating breaks very clearly at the same points as did the densities. The original curves probably require two differentiations before they are reduced to straight lines. The determination of the heat of dissolution of sulphuric acid solutions with the requisite degree of accuracy presented considerable difficulties, owing to the large amount of heat evolved. The results obtained confirmed the author's conclusions as to the nature of the heat curves in the case of the calcium salts. The whole curve was found to be made up of a series of independent curves, each of which gave a straight line on two, or sometimes, on one differentiation, and the breaks agree in position with those deduced from the other properties. Although Thomsen's determinations of the heat of dissolution of sulphuric acid are far too few in number to prove the real nature of the curve, the author shows that they are quite sufficient to disprove the perfect regularity which Thomsen and his followers attribute to the interaction. Some marked changes are shown by it, and Thomsen's equation, which is supposed to represent the curve so faithfully, is applicable, in reality, to but 1 per cent. of the whole figure. The various hydrates which are proved by this work to exist in solution are numerous and complex. Those which calcium chloride forms contain 6, 7, 8, 10, 13, 18, 28, 86, and 1500 H_2O; calcium nitrate gives hydrates with 3, 3·5, 4·5, 5, 6, 10, 17, 51, 265 and 1810 H_2O; while with sulphuric acid we find hydrates with $\frac{1}{6}$, $\frac{1}{3}$, $\frac{2}{3}$, 1, $\frac{3}{2}$, 2, 4, 5, 9, 13, 24, 52, 135, 510, 1430, and 4950 H_2O. The existence of these is naturally more doubtful in some cases than in others, and it is impossible to determine the exact molecular composition when more than about $10H_2O$ is present. In some cases the hydrates of sulphuric acid have been established by six independent set of results ob-

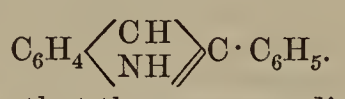
tained from the study of four distinct properties. The excessively large amount of water present in the highest hydrate is a matter of especial interest, and the existence of such compounds explains the influence which mere traces of one substance may have on another substance (*e.g.*, impurities in metals). The highest hydrate of sulphuric acid contains only 0·1 per cent. H_2SO_4, yet the breaks at the extreme ends of the curve are comparatively more marked and more certain than most of the others. The author has recently given a striking proof of the existence of the break in the heat curve of sulphuric acid at 0·3–0·4 per cent., in the fact that the heat of neutralization of this acid becomes "normal" when this break is recognized. The progress of differentiation was always applied to the experimental numbers themselves in the first case, but for the second differentiation it was necessary, owing to the magnitude of the experimental error, to take the smoothed first differential curves, and not the experimental numbers. With the heat results, where the error is comparatively large, the first differentiation was performed on the curve representing the results as well as on the experimental numbers. The author mentions a striking proof that the character of the second differential is not attributable to any peculiarity in the manner in which he drew the first differential figure from which it is deduced. When the contraction produced on mixing sulphuric acid and water in different proportions is plotted out, a figure results utterly unlike that representing the densities, and the first differential figure (obtained from the experimental numbers) which it gives is also quite unlike the first differential from the densities, yet these two dissimilar figures give on a second differentiation figures which are identical with each other, both as to the inclination of the straight lines of which they are composed, and as to the points at which these straight lines meet. It may be noted that the maximum contraction on mixing sulphuric acid and water does not occur at a point corresponding to $H_2SO_4,2H_2O$, as has hitherto been supposed, but at a point some 4 per cent. below it, a point which is not coincident with any break. The final conclusion which the author deduces from his work is the absolute rejection of any theory of dissolution other than the hydrate theory.

The Expansion of Water and other Liquids. By S. U. Pickering.

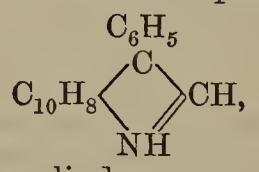
The Formation of Phenylindoles by Isomeric Change. By Walter H. Ince, Ph.D.—It has been observed by E. Fisher and Th. Schmitt (*Ber.*, 1887, 1071, 1811) that when the phenylindole



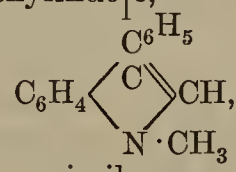
is heated with zinc chloride at 170° it is converted into the isomeride



The author finds that the corresponding naphthindole,



and the methylphenylindole,



undergo change in a similar manner, although action takes places neither so easily nor so completely as in the simpler case.

An Improved Soxhlet Extractor and Vacuum Distilling Apparatus. By J. Lewkowitsch, Ph.D.—The author attaches a tap at the bottom of the syphon-tube of the Soxhlet extractor by means of which a few drops of the solvent as it runs from the extracted substance can be withdrawn to ascertain whether the extraction is complete. For use in distilling small quantities of liquid which froth and through which it is necessary to pass an air-current while distilling under reduced pressure, he describes a flask made by inserting and sealing in just above the bulb of a Wurtz flask a tube which passes down nearly to the bottom of the flask, and there terminates in a fine point. He also describes a simple adapter for use in fractional distillation under reduced pressure.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, May 9, Mr. F. Browne, Vice-President, in the chair.

The following paper was first read :—

Selenium and its Compounds.

BY A. J. SIMONS.

The element selenium was discovered by Berzelius in 1817 in the deposit on the floor of the sulphuric acid chambers in the manufactory at Gripsholm in Sweden. Although it does not occur in great abundance it is widely distributed over the globe. Native selenium occurs as riolite at Culebras in Mexico. Mixed with sulphur it is found as selen-sulphur in Volcano, one of the Lipari islands. Of the native selenides, naumannite, a selenide of silver, occurs in the Hartz, and at Tasco, in Mexico. Eucairite, a selenide of silver and copper, in Sweden, Chili and in the desert of Atacama. Crookesite, a selenide of copper and thallium with a little silver, comes from Norway. Zorgite, a selenide of copper and lead, from the Hartz at Glasbach. Lehrbachite, a selenide of lead and mercury, from the Hartz. Clausthalite, a selenide of lead, the mineral from which I prepared the hydrogen selenide and amorphous selenium, from Zinken and Clausthal in the Hartz, Reinsberg, in Saxony, Rio Tinto, near Seville, in Spain, and from Mendoza in South America It contains 28·11 per cent. of selenium, 70·98 per cent. of lead, together with a little cobalt. Some selenites have also been found native.

The iron pyrites which is used in the manufacture of sulphuric acid contains a small percentage of selenium, and the selenium which is found in the chambers comes from this source.

To prepare the selenium of commerce the deposit from the sulphuric acid chambers, which contains besides selenium, sulphur, arsenic, zinc, tin, lead, iron, copper and mercury, is mixed with nitro-hydrochloric acid, heated, and allowed to stand for a day. Dilute sulphuric acid is now added, which precipitates the lead: this is filtered off and hydrogen sulphide passed through the filtrate, which precipitates the selenium, copper, mercury, tin and arsenic as sulphides. The yellowish precipitate is washed, and then boiled with nitro-hydrochloric acid until everything except the sulphur is dissolved, the solution is again filtered, the excess of acid driven off by evaporation, and the copper, tin, and part of the mercury precipitated with caustic potash. The liquid is then filtered, evaporated to dryness, and ignited to expel the rest of the mercury.

The residue, while it is still hot, is mixed with ammonium chloride, and the mixture heated in a retort till the ammonium chloride is all volatilized. Some of the selenium sublimes in the upper part of the retort. the greater portion remains with the saline mass in the bottom of the retort. This is all placed on a filter, and the saline matter washed away with water. Selenium remains behind on the filter.

Another and quicker method of isolating the selenium from the seleniferous deposit is to dissolve the deposit in hot caustic potash and allow it to stand in contact with air for six or seven hours. Potassium hyposulphite is formed, and selenium precipitated.

To prepare the selenium from clausthalite, I powdered the mineral and treated it with hydrochloric acid to free it from the chalk and other carbonates with which it is associated in nature, then roasted the residue with burnt tartar and charcoal in a hessian crucible, placed the mass on a filter, and washed it with water until the filtrate was colourless; the washings were exposed to the air, when the selenium separated in the form of a crust on the top of the liquid.

Selenium, like sulphur, occurs in various allotropic modifications, both crystalline and amorphous; these forms have been carefully studied by Berzelius, Hittorf, Mitscherlich and Regnault.

Amorphous selenium is precipitated from a solution of hydrogen selenide either when a current of electricity is passed through it, or when it is allowed to stand for any length of time in contact with air. This variety is called electronegative selenium, and is very easily soluble in carbon bisulphide.

Selenium is also obtained in an amorphous state, when an electric current is passed through an aqueous solution of selenious acid, or when the acid is reduced by sulphurous acid. Roscoe says this variety is soluble in carbon bisulphide. Thorpe and Watts say it is insoluble. I found that when first precipitated it was easily soluble, but when dried it was not so readily soluble. It has a specific gravity of 4·26.

Granular selenium can be prepared by very slowly cooling fused selenium. It has a granular surface, and when broken exhibits a fine grained fracture; it is quite insoluble in carbon bisulphide. Its specific gravity is 4·801.

A crystalline variety insoluble in carbon bisulphide can be prepared by sublimation. The selenium deposited from a solution of an alkaline selenide, when it is exposed to the air, is crystalline, and, according to Mitscherlich, is the same as the granular variety.

The solution of selenium in carbon bisulphide deposits monoclinic crystals which will readily dissolve again in the warm liquid. They have a specific gravity of 4·46 and a hardness of 2.

Regnault found the specific heat of crystalline selenium to be ·0762 between 98° and 20°, and of amorphous ·1036 between 87° and 19°. Selenium is insoluble in water, and but slightly soluble in sulphuric acid. When heated in air it burns (when in contact with the flame) with a blue colour to the dioxide. The vapour of selenium is a scarlet colour. Selenide of hydrogen was first isolated by Berzelius. It can be prepared by passing hydrogen and selenium vapours through a hot tube. Metallic selenides give off this gas when treated with a dilute mineral acid. It is a colourless gas with a powerful odour. On first smelling it seemed to me to smell little worse than hydrogen sulphide, but immediately afterwards I became aware of a painful stinging dryness in the nostrils and a loss of all sense of smell. Indeed for nearly an hour I could not detect the presence of strong ammonia. My eyes were also very much bloodshot, and for some days I suffered effects similar to a cold in the head.

Two oxides of selenium are said to exist, both of which are produced when selenium burns in oxygen. Selenic oxide has not been obtained in a pure state. Berzelius said that it was slightly soluble in water, to which it gave its smell, but no taste.

Selenium dioxide I prepared by heating the element in a stream of dry oxygen. The selenium took fire and burnt with a bluish green flame, and the oxide sublimed together with a little unoxidized selenium. I also prepared some selenium dioxide by dehydrating selenious acid. It is a white solid which sublimes in long, needle-shaped crystals. It rapidly absorbs water from the air, forming selenious acid. Selenious acid is easily prepared by boiling selenium in nitric acid. Nitrous fumes are given off, and selenious acid remains in the liquid, which on evaporation yields crystals of the acid.

Selenious acid is very easily reduced, stannous chloride, sulphurous acid and phosphorous acid completely precipitating the selenium in about half an hour. Tin, zinc and iron also precipitate the selenium from a solution to which hydrochloric acid has been added. An alkaline sulphite precipitates selenium rapidly from selenious acid in strong sunlight, but very slowly in the dark. Hyposulphite of soda precipitates sulphide of selenium when boiled with selenious and hydrochloric acids.

Berzelius said selenic oxide was formed when selenium was boiled with selenious acid. Sulphuretted hydrogen precipitates sulphide of selenium from the acid.

The selenites have a saline taste. When heated on charcoal they decompose into selenides or oxides and selenium. If they are fused with carbonate of soda they produce a stain on silver when moistened with water which is like the stain produced by alkaline sulphides. They are all soluble in nitric acid.

The selenite of ammonia is prepared by passing ammonia gas through an alcoholic solution of selenious acid. Crystals can be obtained from it by evaporation over sulphuric acid *in vacuo*. It is decomposed by heat, water and ammonia being given off and selenium left behind.

Selenite of barium is produced when nitrate of barium is precipitated with potassium selenite. It is insoluble in water, but soluble in acids. Infusible at the melting point of glass.

Selenite of copper is precipitated when ammonium selenite is added to a hot solution of copper sulphate. It is decomposed by heat.

Selenite of magnesium is prepared by neutralizing selenious acid with magnesium carbonate. It is slightly soluble in hot water, from which crystals may be obtained. When strongly heated it attacks glass. Silver selenite can be obtained by adding silver nitrate to an aqueous solution of selenious acid. It is easily fusible and not blackened by light. Decomposed on strongly heating.

Neutral selenite of potassium is obtained by neutralizing selenious acid with potassium carbonate. It melts on heating, turning yellow, but becomes white again on cooling. It is insoluble in alcohol.

Selenic acid was discovered in 1827 by Mitscherlich, who prepared it by precipitating an alkaline selenate with a soluble lead salt, and decomposing the lead selenate formed with sulphuretted hydrogen. But according to Wohlwill the lead selenate was difficult to completely decompose, and he preferred preparing it by treating copper selenite with chlorine and separating the cupric selenate from the selenite by filtration and from the chloride by precipitating with alcohol. The cupric selenate is then decomposed with sulphuretted hydrogen and the selenic acid filtered and concentrated *in vacuo*. Rose prepared selenic acid by treating selenium or selenious acid with an excess of chlorine in the presence of water. Berzelius prepared it by passing chlorine through a solution containing selenite of potassium and free potash.

Wohlwill discovered that selenic acid was formed when the peroxides of lead or manganese were heated with selenious acid.

Selenic acid is a colourless liquid, sp. gr. 2·6, boiling at 280°. Like sulphuric acid it is very hygroscopic, and on addition of water its temperature is very much raised. It is not reduced by sulphurous acid, but on boiling with hydrochloric, chlorine is given off and selenious acid formed.

Selenate of barium is precipitated when a soluble barium salt is added to a a solution of a selenate. It is decomposed on boiling with hydrochloric acid into selenite, which dissolves in excess of acid. Selenate of copper is produced when copper oxide is dissolved in selenic acid. Selenate of lead is prepared by precipitating a soluble lead salt with a solution of selenate of soda. Silver, iron and zinc dissolve in selenic acid, forming the corresponding selenates. Selenate of potash is prepared by fusing nitrate of potash with selenium or selenious acid.

Selenium dichloride is prepared by passing dry chlorine over an excess of selenium. It is a dark yellow liquid, readily decomposed by water. The tetrachloride is prepared by passing an excess of chlorine over selenium. It is dissociated by heat, and decomposed by water, according to the following equation:—

$$SeCl_4 + 3H_2O = 4HCl + H_2SeO_3.$$

It is a white crystalline substance, which is converted into the oxy-chloride by moisture.

The bromide of selenium is prepared by dropping small portions of selenium into bromine. The two unite with a hissing sound. It is a yellowish mass which fumes in air. It is decomposed by water into hydrobromic and selenious acids.

Fluoride of selenium can be prepared by passing selenium vapour over heated fluoride of lead (Knox). The fluoride of selenium sublimes in crystals; it is decomposed by water into hydrofluoric and selenious acids.

The paper was illustrated by specimens of the native compounds of selenium, and selenides, selenites, etc., prepared by the author; it was followed by a discussion in which the Chairman, Messrs. Fuge, Ough, Latchmore, and Short took part.

A Report on Botany by Mr. W. Wyatt was then read in the author's absence by the Secretary. The subject was the Colours of Flowers, and Mr. Wyatt, after remarking on the variety of brilliant colours met with in the corollas or perianths of flowers, proceeded to speculate as to their origin. He argued that the exterior floral whorls might originate in two ways, first from modified foliage leaves, the view generally adopted, second from modified stamens. The original petals would naturally possess the colour of the organs from which they were derived, which in the first case would be green, in the second yellow. The generally accepted theory that petals were a transition stage between foliage leaves and essential organs was opposed by the argument that the oldest known types were the coniferæ, which had stamens and ovules, but no corollas; although therefore the essential organs might originally have been derived from foliage leaves, the petals might with equal probability have originated as modified and sterilized stamens. This view was supported by the prevalence of yellow as the colour of the great majority of the simpler types of flowers, and was illustrated by the water-lily in which a gradual transition can be traced from the perfect stamen to the ordinary petal. The theory that the colours of flowers are developed for the purpose of attracting insects for the object of fertilization was then discussed, and it was stated that specific colours are known to attract certain kinds of insects, the flowers fertilized by the agency of small insects being white, *e.g.*, *Galium Mollugo* fertilized by small flies, those by beetles yellow, *e.g.*, *Galium verum*, etc. The various colours found in the important natural order were then gone into at some length, the general conclusions arrived at being that the simplest flowers are usually yellow, that the simpler flowers of a species or genus have a tendency to be yellow, and the more advanced members white or pink, and that blue is the colour typical of highest development.

The Report gave rise to a discussion in which the Chairman, Messrs. Salter, Fuge, Jones, Simons, Ough, Smith and the Secretary took part.

A meeting was held on Thursday, May 23, Mr. F. Browne, Vice-President, in the chair.

Mr. Wallace W. Crisp read a paper on "Beer and Brewing," giving details of the various processes in the preparation of the malt, viz., steeping, couching, flooring, and kiln-drying; the water and hops were next considered; finally the operations of mashing, boiling, cooling, fermenting and cleansing were described.

The paper was illustrated by specimens of the materials in different stages of the process, and gave rise to a discussion.

Mr. W. J. Talintyre then read a paper on the "Teesside Iron Industry," describing from personal observation the process of iron-smelting as carried out in the Cleveland district.

A discussion followed, in which the Chairman, Secretary, Messrs. Williams, Fuge and Crisp took part.

Mr. Albert Smith next read some "Notes on Dispensing," dealing with various incompatible or difficult prescriptions, such as chloral hydrate with aromatic spirit of ammonia, iodine with ammonia, chloroform emulsions, solution of strychnine with aromatic spirit of ammonia, the suspension of subnitrate of bismuth and of quinine, etc.

The subject was discussed by the Chairman, Secretary, Messrs. Williams, Ough, Crisp, Fuge and Talintyre.

A note on the "Composition of a Counterfeit Halfcrown," by Mr. C. W. Andrew, was then read by the Secretary. The coin had a smooth worn appearance, and bore the head and inscription of one of the Georges; it was found to consist of tin 70½ per cent., antimony 29½ per cent., and a trace of lead.

A short discussion followed.

Provincial Transactions.

LEICESTER AND LEICESTERSHIRE CHEMISTS' ASSOCIATION.

The annual meeting of this Association was held at the Guildhall Library, Leicester, on Thursday evening, May 30. In the unavoidable absence of the President, Mr. J. G. F. Richardson, on account of indisposition, Mr. J. Young presided.

The Honorary Secretary (Mr. J. J. Edwards) read the annual report, which was as follows:—"Your Committee, in presenting the annual report, congratulate the members on the success of the Association. A class for the study of practical botany was conducted during the summer months of last year, and your Committee have again to thank Mr. J. Burn, of the Abbey Park, for a generous supply of flowers, etc., for this class. Your Committee are pleased to notice that the Botanical Garden at the Abbey Park is in a forward state, and great hopes are entertained as to the advantage it will prove to students. Arrangements were again made for a practical chemistry class to be held in the Wyggeston School Laboratory, during the winter session, but fewer students availed themselves of this advantage. Our thanks are due to the Rev. J. Went, M.A., and Mr. A. Poyser, B.A., for their courtesy and kindness. A class for the study of the chemistry of the British Pharmacopœia was held at the Association Rooms during the winter months. The thanks of the Association are due to Messrs. Burford, Goodess and Shepherd for the attention they have given in conducting the various classes. Your Committee are pleased to call attention to the establishment of a prize fund, and to thank those who have so generously contributed to it. A Conversazione and Soiree was

held at the Co-operative Hall, Leicester, on November 28, 1888, at which the prizes gained by the students were distributed by the President. The gathering was a great success, and a large number of members and their friends spent a very enjoyable and social evening. Meetings of the trade were held in connection with the 'Railway Rates Bill,' and action decided upon. Several gifts of books, periodicals, and specimens have been presented to the Association, and your Committee beg to thank the respective donors. Messrs. Clark, Burford and Shepherd were delegates to the British Pharmaceutical Conference at Bath last year."

Mr. S. F. Burford moved the adoption of the report, which he said was on the whole satisfactory, Mr. W. Rowe seconded, and the motion was carried unanimously.

The Treasurer then read the financial statement, which showed a balance in hand of £7, and an increase in the number of apprentices who had joined the Association.

Mr. Brall moved a vote of thanks to the teachers for the attention they had given to the classes. Mr. B. Lewitt seconded, and the resolution being unanimously adopted, Messrs. S. F. Burford, F.C.S., and Mr. J. H. Shepherd replied.

Votes of thanks to the Council of the Association, to the Rev. J. Went, M.A., Mr. A. W. Poyser, B.A., and to the Chairman, brought the business to an end.

The following were elected to serve as Council for 1889:—President, Mr. J. G. F. Richardson, F.C.S.; Vice-Presidents, Mr. S. F. Burford, F.C.S., and Mr. G. Woolley; Treasurer, Mr. W. Thirlby; Honorary Secretary, Mr. J. H. Shepherd; Members of Council, Messrs. E. H. Butler, B. Lewitt, W. Rowe, G. Ward and J. Young.

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

The annual meeting of this Society was held at the rooms, Shakespeare Street, on Wednesday evening, Mr. W. H. Parker, Vice-President, in the chair.

The Honorary Secretary, Mr. W. Widdowson, read the Council's annual report, which showed that the Society is still carrying on in a successful manner the educational work for which it was principally formed. A course of twenty-two lectures, followed by practical demonstration, had been given at the University College during the first two terms of the session 1888–89, by Mr. J. W. Carr, B.A. Twenty-five students attended during the first term, and nineteen during the second. At the end of each term an examination was held, at which respectively fourteen and ten students presented themselves. The first three students in order of merit were Messrs. C. Clutterbuck, T. J. Shaw, and H. H. Boor. Several other papers were also very creditable. Eight associates or students of the Association had succeeded in passing the Minor examination of the Pharmaceutical Society during the past session. A pharmacy class, conducted by Mr. W. Gill, had been held during the first portion of the session at the Society's rooms. About fifteen students joined the class, with an average attendance of ten. An examination was held at the termination of this class. The first three students in order of merit were:—Messrs. T. J. Williamson, W. Hurd, and J. E. Jackson. The Council were making arrangements for holding a course of lectures on "Pharmaceutical Chemistry" at the University College next session. They also contemplated holding a class on "Materia Medica," by Dr. Haydon White, providing a sufficient number of students guaranteed to enter. The Society held its first picnic at Hazleford Ferry, on July 5, last year, when about fifty ladies and gentlemen were present. The annual dinner was held at the Masonic Hall on Wednesday evening, December 5, when about sixty members and friends were present. A trade meeting was held at the Maypole Hotel on Wednesday evening, May 8, to discuss the Railway and Canal Traffic Act. Mr. W. H. Parker was elected Chairman, and after explaining the great injustice that would be inflicted on chemists by the extra charges proposed, a resolution was passed condemning the action of the various railway companies, and a copy was ordered to be sent to Mr. Francis.

Mr. Beilby proposed and Mr. Middleton seconded the adoption of the report, which was carried.

The Honorary Treasurer, Mr. J. Wilford, presented the annual financial report, which showed a balance in hand of £32 16*s*.

A ballot was taken for the officers and Council for the ensuing year, with the following result:—President, Councillor Fitzhugh, F.C.S., J.P.; Vice-President, Mr. W. H. Parker; Treasurer, Mr. J. Wilford; Secretary, Mr. W. Widdowson; Council, Messrs. C. A. Bolton, J. E. Dennis, T. B. Fletcher, W. Gill, A. Middleton, F. Savage, J. S. Radford, and R. Widdowson.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The second botanical excursion of the season took place on the evening of Wednesday, May 29, and was attended by twenty-six members. Leaving the Caledonian Station at 8.40 for Colinton, the company had a most enjoyable ramble through the Colinton Dell on the way back to town. The time was well occupied with most useful practical field work, but many of the more interesting herbs and trees were not yet sufficiently advanced for proper study and it was felt that a visit a week or two later would be well repaid. *Ranunculus Ficaria* and *Mercurialis perennis* were among the plants met with, and served as a practical illustration of the interesting article in the *Pharmaceutical Journal* of the previous Saturday.

Correspondence.

Lessons from the Council Election.

Sir,—The result of the polling for the election, perhaps, will be sufficient to show the present Council that the policy pursued hitherto does not meet with the approval of a majority of the members; and, let us fervently hope, will rouse them from their lethargic slumbers to do something to uphold and protect the interests of the trade.

Education is a most desirable thing, but it is not the "only" need of the pharmaceutical body; at the present time we are groaning under many disabilities which an energetic Council might do very much to rectify. Provincial retail chemists are wearily waiting for the good time coming when the medical fraternity will cease to do their own dispensing, and give the educated pharmacist a chance to earn a livelihood in a legitimate way. Is it too much to expect the new Council to move a little in this direction, by moulding public opinion with a view to persuading, coercing, or compelling the profession to relegate their dispensing into the hands of the qualified chemist? The Medicine Stamp Act and its administration, and other matters connected with the trade, also require earnest consideration and attention.

If every member of the Society, more especially the country members, would rouse themselves sufficiently to record their votes, a Council might easily be elected who would successfully labour to ameliorate some of these crying evils, and put chemists and druggists on an equal footing with other incorporated bodies.

It is melancholy to think that only a small proportion of the whole body of chemists belong to the Pharmaceutical Society, but it is still more vexatious to find that not one half of its members are sufficiently interested to record their votes. I trust to see a change for the better in this direction for the future. Alfred Coleman.

The Position of Associates.

Sir,—May I again trespass on your valuable space for the purpose of assisting Mr. F. Davis to comprehend my "curious letter?" It was unnecessary for me to turn up the register to see that he was an associate not in business. I

grant him there is no educational difference between associates in and out of business, but the associate in business pays his guinea for the mystic letters A.P.S., and the one not in business gets the same distinction at half the price. Does that view of the case commend itself to Mr. Davis, or would he wish to be placed on an equality with and have the same privileges as one who pays twice the money? He might have suggested that the smallest subscription for qualified men should be a guinea, and that it should be compulsory; then, indeed, we might do away with the title of associate entirely.

JOHN W. T. MORRISON.

CO-OPERATION AMONG CHEMISTS.

Sir,—In my humble opinion the one great need for chemists is co-operation. A divided family goes to the wall, but combination always did, and must now, stand a much better chance of success than opposition and dissension. Why could not chemists assemble from time to time at the Pharmaceutical Society for the purpose of discussing the interests of the trade? In the multiplicity of counsel there is much wisdom. I am sure the Society would gladly lend its rooms for such a purpose. It must not be forgotten that the Council is composed of chemists, some of whom no doubt have suffered from the present competition; how unreasonable it is then to imagine that they are in any way opposed to their own calling. No; if the whole body of chemists could show an united front and set down the result of their deliberations as to what is best to do, I am certain the Council would take the matter up; but they have nothing practical to work upon whilst chemists themselves are a disunited body, because if they pleased one section they would displease the other, whereas with a settled plan, the result of the ideas and thoughts of all chemists, or rather, the majority, they could feel that they were working with a practical policy and without the fear of being called over the coals if things were not quite so successful at first as they might appear, or as they ought to be.

I would suggest, firstly, that chemists should try to obtain the exclusive sale of all patents containing poison.

Secondly.—The exclusive sale of all drugs and patent remedies, because the interests of the public demand that the person selling rhubarb, jalap, sal volatile or the like, should be he who knows their qualities and action, so that he can advise the purchaser as to dose, and whether of good quality, etc.

Thirdly.—Some form of State protection as to the sale of certain articles which shall be legal only for chemists to retail, the same as I understand is done in continental towns.

I would ask what position should we be in if the Pharmaceutical Society had never been incorporated, for we should then have been without even our title of "chemist," and any huckster would be at liberty to call himself a chemist. I fancy that whereas a great many manage to survive, very few would have done so without any protection at all. Not that I individually can boast, as being one of those who have only a very small business, I do not know whether I shall survive, but if I do not I cannot blame the Pharmaceutical Society, but the want of combination, whereby the trading position of my business amongst others would be improved. Therefore let me exhort everyone to sink prejudice, to put on one side all personal feelings, and combine for the interest of all concerned.

London, N. C. H. F.

METHYL-ORANGE AND OTHER INDICATORS.

Sir,—Mr. Dott and myself seem to hold much the same views respecting the value of litmus, though we differ somewhat respecting methyl-orange, probably owing to the fact that Mr. Dott has had experience of a faulty specimen. But there are one or two points on which I may apparently add some further explanation with advantage.

I did not urge the claims of methyl-orange and phenol-phthalein to prominent places among useful indicators on the ground of superior delicacy in their reactions, though, as Mr. Dott admits, their advantage in this respect is generally recognized. What I especially contended for was that they were suitable for certain purposes to which litmus was more or less inapplicable, and hence was not to be regarded as mere substitutes for the older indicator. An indicator like methyl-orange, which is indifferent to weak acids, such as sulphuretted hydrogen, hydrocyanic acid, boric acid, and carbonic acid, and which is perfectly neutral in reaction to salts of the heavy metals of neutral constitution, has evidently the advantage in many cases over litmus, while, on the other hand, an indicator like phenol-phthalein, which takes cognisance of the weakest acids, and by means of which hydrocyanic acid, carbonic acid and oleic acid can be accurately titrated, is of still more value. Since my note was written a paper by J. H. Long has been published in the *Chemical News* (vol. lix., page 214), reprinted from the *American Chemical Journal*, in which it is shown that by taking certain precautions, accurate titrations may be made by phenol-phthalein in presence of ammoniacal salts.

The suggestion as to the employment of dimethylamido-azobenzene as an indicator, in place of methyl-orange, is well worthy of attention. The proposal was made by B. Fischer some years since, and an abstract of his paper, including the method of preparing the compound, will be found in the *Analyst*, vol. x., page 152.* Mr. Dott will find a reference to this indicator in the concluding lines of my paper, and a recognition of it as a possible substitute for methyl-orange. But I must protest against methyl-orange being described or regarded as "dimethylamidoazo-benzol sulphate," which perhaps is a slip or misprint for "sulphonate." In the first place dimethylamidoazobenzol is a very undesirable name for the body of the formula:—

$$C_6H_5{\cdot}N_2{\cdot}C_6H_4{\cdot}N(CH_3)_2.$$

We have to take enough of value from the Germans, without assimilating the objectionable nomenclature necessitated by the exigencies of their language. In English the body formulated above is dimethylamidoazobenzene, the termination ol being now uniformly reserved for oxygenated bodies of an alcoholic or phenolic character. The sulphate of the above base would have the formula:—

$$2[C_6H_5{\cdot}N_2{\cdot}C_6H_4{\cdot}N(CH_3)_2],\ H_2SO_4,$$

analogous to sulphate of quinine. On the other hand, methyl-orange is the ammonium or sodium salt of the sulphonic acid of dimethylamidoazobenzene, which acid has the formula $C_6H_4(SO_3H){\cdot}N_2{\cdot}C_6H_4{\cdot}N(CH_3)_2$.†

It would be inaccurate to call methyl-orange the "acid sulphite" of the base, though such a description would at least give a notion of its empirical formula, if not of its molecular constitution, but to allude to it as the "sulphate" appears to me simply misleading. If correct, it is evident in titrating dilute sulphuric acid with the aid of Fischer's indicator, the base would at once be converted into methyl-orange, and the advantage claimed nullified.

It is rather dangerous to assume that a new indicator can be substituted in all cases for one the behaviour of which is well known. Thus it is my contention that methyl-orange and phenol-phthalein are not to be regarded as substitutes for litmus. If it be true that Fischer's indicator can be substituted for methyl-orange in all cases it seems to follow that dimethylamidoazobenzene does not unite with weak acids, such as carbonic, oleic, arsenious, etc., but that it does unite with thiosulphuric, sulphurous, and stronger acids. This may all be true, but I am not aware that it has been demonstrated.

Sheffield. ALFRED H. ALLEN.

* Fischer's indicator is directed to be prepared by dissolving 9·3 parts (1 mol.) of aniline in 30 parts (2 mols.) of hydrochloric acid (25 per cent.). To the dilute acid cold liquid is added an aqueous solution of 7 grams (1 mol.) of sodium nitrite, whereby the aniline hydrochloride is converted into diazobenzene chloride, according to the equation $C_6H_5{\cdot}NH_2,HCl+HNO_2 = C_6H_5{\cdot}N:N.Cl+2H_2O$. The liquid obtained is poured into a solution of 12 grams (1 mol.) of dimethyl-aniline in 15 grams of hydrochloric acid; and, after allowing the mixture to stand, about 30 grams of sodium acetate added. The crystals of dimethyl-amidoazobenzene which separate are purified by resolution in alcohol. The base forms small yellow plates, melting at 115° C., and insoluble in water, but soluble in alcohol. A ½ per cent. solution in alcohol is of suitable strength for use as an indicator.—A. H. A.

† Compare *Pharm. Journ.*, [3], xviii., 379.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Johnston, Davis, Symons, Shenstone, Hersant, Allan, Rowe, Rose, Marsden, Chemist and Druggist, North of Scotland Associate in Business, A. P. B.

ULEXINE:

ITS PHYSICAL AND CHEMICAL CHARACTERS.

BY A. W. GERRARD AND W. H. SYMONS.

In a previous volume of the *Pharmaceutical Journal** one of us has already described the methods by which ulexine was obtained from the seeds of *Ulex Europæus*, or common furze, and pointed out its chief characters and tests. We have now made a further study of this alkaloid, the results of which are recorded in this communication.

Physical Characters.—Ulexine is freely soluble in chloroform, and can be best obtained in colourless, odourless crystals, by evaporating its chloroformic solution. The crystals are anhydrous and remarkably soluble in water, readily deliquescing when exposed to moist air. Ulexine is insoluble in absolute ether.

Examined on the "hot stage" of a microscope, after the manner described by one of us in the *Pharmaceutical Journal* (vol. xiii., page 1), ulexine was found to undergo no change when kept for a lengthened period at 120° C., but at 130° C. there formed on the cover glass a slight mist consisting of minute drops of a liquid which did not crystallize on cooling. The mass on the stage melted at 151° C. and continued to give off small quantities of apparently aqueous vapour. A sublimate of small crystals was obtained at 170° C., but it probably represented some decomposition product. The mass on the stage still possessed the property of crystallizing on cooling, and like most alkaloids could be cooled considerably below its melting points before crystals were formed, if kept undisturbed. It is noteworthy that although it had undergone partial decomposition its melting point was approximately unaltered. At 175° C. ulexine begins to char, and no longer shows definite crystals on cooling. Heated to 280° C. it still refused to sublime as a whole, a considerable residue of charred matter remaining on the stage. These results were obtained with less than a milligram of the alkaloid.

About 0·1 gram of ulexine was then sealed up in a nearly vacuous tube, and heated in a bath of syrupy phosphoric acid side by side with a thermometer. Under these conditions it appears much more stable. It melted at 151° C., but after heating for some time at 225° C. it was but little altered in colour and crystallized well on cooling; a small quantity of long feathery crystals condensed on the upper part of the tube, but no moisture was observable. It would therefore seem that the decomposition noticed on the open stage was in a great measure due to oxidation.

The platinum and gold salts and the bromo derivative of ulexine were similarly examined. The gold salt was found to be less stable than ulexine itself, but the platinum salt and the bromo derivative were much more stable.

Chemical Properties.—Ulexine is a strong base: it precipitates quinine, cocaine and strychnine from solutions of their salts; it also liberates ammonia from its compounds. Ulexine dissolves in nitric acid, specific gravity 1·42, and in sulphuric acid without coloration; but if to a drop of solution of ulexine in such nitric acid, spread out on a white tile, a drop of strong sulphuric acid be added, a yellow or red ring appears round the sulphuric acid.

With ferric chloride, ulexine or its salts give a red coloration which disappears on dilution with water. If to a solution of ulexine in chloroform bromine be added drop by drop, a nearly white precipitate (probably monobromo-ulexine) falls. On further addition of bromine this is converted into an orange-coloured body which subsequent analysis leads us to think may be tribromo-ulexine.

When crystals of the pure alkaloid were combusted with cupric oxide in a stream of oxygen the following figures were obtained :—

Ulexine.		Hydrogen.	Per cent.	Carbon.	Per cent.
0·338	gave	0·0232	= 6·87	0·2326	= 68·82
0·318	„	0·0238	= 7·48	0·2190	= 68·87
0·303	„	0·0220	= 7·26	0·2062	= 68·05
		Mean .	7·2		68·6.

Burnt with soda lime :—

Ulexine.	Nitrogen.	Per cent.
0·470	·0665	14·15
0·258	·0364	14·11
0·407	·0581	14·27
	Mean . .	14·2

The platinum salt gave 24·52 per cent. platinum, and the formula $C_{11}H_{14}N_2O$ is suggested. The following show the differences between the theoretical and experimental numbers :—

	Calculated.		Per cent.	Found per cent.
C_{11}	× 11·97 =	131·67	= 69·42	68·6
H_{14}	× 1·00 =	14·00	= 7·38	7·2
N_2	× 14·01 =	28·02	= 14·77	14·2
O_1	× 15·98 =	15·98		
Formula weight		189·67		

The platinum salt of ulexine was made by adding solution of platinic chloride to a strong solution of ulexine hydrochloride until a precipitate ceased to form. The product was thrown on a filter and washed with absolute alcohol, and finally with ether. The salt, which is insoluble in alcohol, and moderately soluble in water, can be obtained in lustrous crystalline plates by dissolving in warm 60 per cent. alcohol and allowing to cool.

The gold salt of ulexine was prepared in much the same manner as the platinum compound. It is best crystallized from cold aqueous solution, as on heating it darkens in colour and appears to become partly reduced.

The platinum salt . . . $2C_{11}H_{14}N_2O,H_2PtCl_6$.
0·3091 gave . . 0·0762 Pt. = 24·81 per cent.
0·4640 „ . . 0·1134 Pt. = 24·44 per cent.

Mean . . 24·52

Assuming the atomic weight of platinum to be 194·5, and that of chlorine 35·37, theory requires 24·68 platinum.

The gold salt . . $C_{11}H_{14}N_2O$, $HAuCl_4$.
0·6520 . . gave 0·2448 Au = 37·54 per cent.
0·6278 . . „ 0·2350 Au = 37·43 „
Mean . . . . . 37·49.

With gold as 196·8 the above formula requires 37·2.

The precipitate above referred to as probably tribromo-ulexine $C_{11}H_{11}Br_3N_2O$ was washed with chloroform and alcohol and dried. It was then combusted with pure lime in a tube covered with asbestos paper. Only one combustion was made. The following figures were obtained :—

0·547 gram gave 0·713 gram AgBr.

* Vol. xxii., p. 101, 229.

This with silver as 107·66 and bromine as 79·75 shows that the ulexine compound contained 55·41 per cent. bromine. The above formula, which needs further confirmation, requires 56·17 per cent.

The behaviour of ulexine towards "alkaline permanganate" was next investigated. To 700 c.c. of water 50 c.c. of alkaline permanganate was added and 250 c.c. distilled off. The last 50 c.c. was quite free from ammonia. A solution containing 0·93 m.g. ulexine was then added and distillation continued, 7 lots of 50 c.c. being now drawn off and separately Nesslerized. Subsequently all the lots were mixed and compared with standards which had been prepared at the same time. The total quantity of ammonia collected was 0·105 m.g or 11·29 per cent. The experiment was repeated with 1·86 m.g. ulexine, drawing off 9 lots of 50 c.c., the distillation being carried nearly to dryness; 0·213 m.g. ammonia was obtained, or 11·4 per cent. It was noticed that the chief quantity of ammonia came over in the second and third lot of distillate, and that the last lot still contained a trace. Ulexine itself yields no colour with Nessler. By the soda-lime process we found 14·2 per cent. nitrogen. Two-thirds of this quantity as ammonia would be 11·5 per cent. It is to be further observed that the formula we give for ulexine contains 2 atoms of nitrogen, the whole being obtained on burning with soda-lime, with fairly regular results. Wanklyn supposes that the nitrogen which does not come off as ammonia, when treated with alkaline permanganate, exists in direct combination with oxygen. We can offer no explanation of these results at present, but we hope with a further supply of material to throw some light upon the constitution of ulexine.

With regard to the physiological action of ulexine, Dr. J. Rose Bradford, in the *Journal of Physiology*, vol. iii., says, "It has a powerful and widespread action, being a nerve and muscle poison, a respiratory poison, raising arterial tension and producing diuresis; but the respiratory action being produced by the smallest doses seems the most important."

M. Pinet in *Archives de Physiologie*, says, "From the results of his experiments he concludes ulexine is the antidote to strychnine."

E. H. Fenwick (*Lancet*, September 24, 1887, 604) says, "Ulexine, although a powerful diuretic, must be employed with caution in stricture, one-tenth of a grain having caused temporary suppression of urine, vomiting and fever."

We have further to state that from the residues of the purification of ulexine we obtained a second base. It is a syrupy fluid, differing from ulexine by its solubility in ether. A few crystalline salts have been obtained, but not in sufficient quantities for analysis. Whether this base exists in the seeds or is a decomposition product we cannot positively state, but the fact that it is found in the first extraction of crude ulexine supports the view that it is a natural product of the seeds. The quantity at our disposal being small for the present, its investigation is postponed.

In conclusion, we have to thank Mr. T. Christy, who holds the principal stock of ulexine, for supplying material for the physiological experiment, and to Messrs. Idris and Co. for allowing the bulk of the chemical work to be done in their Laboratory.

THERMOMETERS.*

BY FRANK BROWNE.

(*Concluded from page* 1013.)

(3) *Error of Parallax.*—An apparent change in the situation of the end of the mercurial column, owing to the eye not being in the same horizontal plane as the mercury. If the eye is too high, too high a temperature is taken; if too low, the temperature recorded is too low. When looking obliquely at the top of the mercurial column, the graduation mark at that point is reflected from the outside of the mercury. This cannot be seen when the eye is level with it, consequently this fact may be applied for overcoming the difficulty. Another method is to take the reading through a narrow slit in a sheet of note paper or by using a cathetometer.

Minor sources of error are, expansion of the glass, unequal expansion of the mercury, reading the thermometer placed in a vertical position (this is an error only under certain conditions), volatilization of the thermometric liquid and inertia of the bulb. Although the expansion of the glass gives rise to an error above 204·5°, it does not do so below that temperature, for in the latter case it almost exactly compensates for the unequal expansion of the mercury. Comparing the air thermometer with the mercurial, the following figures show the compensation:—

Temperature indicated by air thermometer.	By mercurial.†
200°	200°
300°	300°
350°	354°

When a thermometer that has been graduated in a horizontal position, which is seldom the case, is read in a vertical position, an error of from −·1° to −·2° is occasioned, owing to the column of mercury pressing upon and dilating the bulb.

Volatilization of the mercury takes place at all temperatures; but at about 150° an error is very liable to be caused, particularly if the upper portion of the tube is comparatively cool. In Geisler's instruments a small volume of hydrogen is contained in the tube, which considerably retards the volatilization.

The inertia of the bulb causes the mercury to rise by a series of small oscillations; in instruments of fine bore about a dozen taps should be given before reading, while less delicate ones require tapping for two or three minutes.‡

It is sometimes noticed that the mercury refuses to pass certain points of the tube; this Pickering attributes to a difference in the nature of the glass. Instruments intended for delicate work should be examined for any such imperfections.

When taking exact readings the whole of the mercury column should be immersed in the liquid. When this is not done an error arises owing to a portion of the column not being exposed to the same temperature as the bulb. An approximate correction of this error may, however, be made as follows:—

Ascertain the mean temperature (t) of the air or other medium to which the upper portion of the stem is exposed, by means of a second thermometer,

* Read before the Chemists' Assistants' Association.
† Fownes' 'Chemistry,' p. 32.
‡ *Phil. Trans.*, 1886, 330.

the bulb of which is placed in contact with the stem of the thermometer used in the determination. Then if (a) represents the number of degrees of mercury not immersed in the liquid, and (T) the thermometer reading, to this latter must be added 0·00016 : a (T–t). 0·00016 is the difference between the coefficients of cubical expansion of mercury and glass, or the apparent coefficient of expansion of mercury in glass. In long and massive thermometers 0·00012 may be written for 0·00016 and the air temperature may be taken for (t).*

Verification and Calibration.—It has been shown that many errors may occur in thermometers ; in accurate work it is essential to ascertain to what extent these exist, in order that the proper corrections may be made. This is effected by several methods ; the most frequently employed are :—

1. Verification by comparing with a standard.

2. Bessel's method, simplified by Professor Forbes.†

In the course of an investigation conducted in the Research Laboratory of the Pharmaceutical Society it became necessary to re-graduate six thermometers ; for these the first method was employed. As more than one instrument was verified at a time, only three similar experiments were required. The standard and thermometers were first placed in melting ice and the zero points determined. Melting ice was then exchanged for water, which was slowly heated to 5°, as indicated by the standard. The position of this point was then observed upon the other instruments. This plan of procedure was followed up to 15°, when a different apparatus was required. This consisted of a boiling tube, length about 1 metre, half filled with water. Two thermometers and the standard were fastened together by indiarubber bands, and in order to overcome the effects of convection currents they were fixed by means of grooved corks in a long test-tube, which was also filled with water. The thermometers were completely immersed in the liquid. Heat was now applied, and when the mercurial column reached the required point, it was kept there for a few seconds while readings were taken. The water was constantly agitated. The comparison of the boiling points having been made, the water was removed and glycerine substituted ; the process then proceeded as before. The thermometers marked *a*, *b*, *d*, *e*, *f* and *h* were verified for every 5° from 0° to 190°. In the curves the abscissæ represent the readings of the scale, and the ordinates the errors. The curve to the right of the letter in every case represents the particular thermometer denoted by that letter. From the table it is seen that the zero-point of—

(*a*)	had risen	0·5°
(*b*)	,,	1·0°
(*d*)	,,	1·0°
(*e*)	,,	1·5°
(*f*)	,,	1.0°
(*h*)	,,	0·75°

The errors are greatest at about 170°. In *f* at 27° there was an inequality in the bore of the tube, it being perceptibly constricted at that point.

It is clear that had these instruments, which had been purchased of well-known apparatus makers, been regarded as correct, serious errors might have arisen.

Table showing temperature indicated by the six thermometers and a Standard S. when similarly exposed to heat.

s.	a.	b.	d.	e.	f.	h.
0°	0·5°	1°	1°	1·5°	1°	0·75°
5	5·5	6	6	6·25	6	5·75
10	10·5	11	11	11·25	10·75	10·75
15	15·25	16	16	16·25	16	16
20	20·35	21·1	21·1	21·35	21·1	20·85
25	25·6	26	26·1	26·35	26·2	26·1
30	30·6	31·1	31	31·35	31·35	30·6
35	35·6	36·1	36·1	36·35	36·35	35·85
40	40·5	41	41	41·25	41·25	40·75
45	45·5	46	46	46·1	46·25	45·75
50	50·5	51	51·1	51	51·5	50·5
55	55·5	56	56·1	56	56·5	55·25
60	60·5	61	61·1	60·75	61·5	60·5
65	65·5	66	66	65·75	66·5	65·25
70	70·5	71	71·1	70·5	71·25	70·5
75	75·5	76·5	76	75·75	76	75·25
80	80	81	81	80·5	81	80·25
85	85·1	86·1	85·85	85·35	85·6	85·35
90	90·1	91·1	90·6	90·35	90·6	90·1
95	95·1	96·1	95·1	95·1	95·1	94·85
100	99·85	101·1	100·35	100·1	100·6	100·1
105	104	105	105	105·25	105	105
110	109·4	110·4	109·65	110·4	109·9	109·9
115	114·35	115·35	114·85	115·1	114·85	114·85
120	118·8	119·8	119·55	120	119·8	119·3
125	123·8	124·8	124	125	124·8	123·8
130	128·8	129·8	129	130	129·8	128·8
135	133·75	134·75	134·25	135	134·75	133·75
140	138·7	139·2	139	140	139·7	138·7
145	143·6	144·1	143·1	144·6	144·35	143·1
150	148	149	148	149·75	148·5	148
155	152·5	154	152·75	154·75	153·25	152·75
160	157·5	158·5	157·5	160	157·75	157·5
165	161·9	163·4	162·4	165·4	162·4	162·15
170	166·8	168·3	167·8	169·3	167·3	166·8
175	171·3	173·3	173·8	174·3	172·3	172·3
180	176·3	178·3	177·8	179	177·3	176·8
185	181·25	183	182·75	183·75	182·5	181·75
190	186·2	188·2	187·2	188·2	187·3	186·8

II. Calibration.—In this method a standard is not required. In order that this method may be perfectly intelligible, the calibration of a thermometer is described in detail.

The freezing point was first determined and was found to have risen 0°·1. The apparatus used consisted of a cylindrical lamp glass, filled with powdered ice and resting upon some coarser lumps at the bottom of a large beaker ; the space between the outside of the glass and the beaker was filled also with powdered ice. After the thermometer had remained in the inner vessel for twenty minutes the reading was taken by removing the ice so that the zero might be seen without raising the scale.

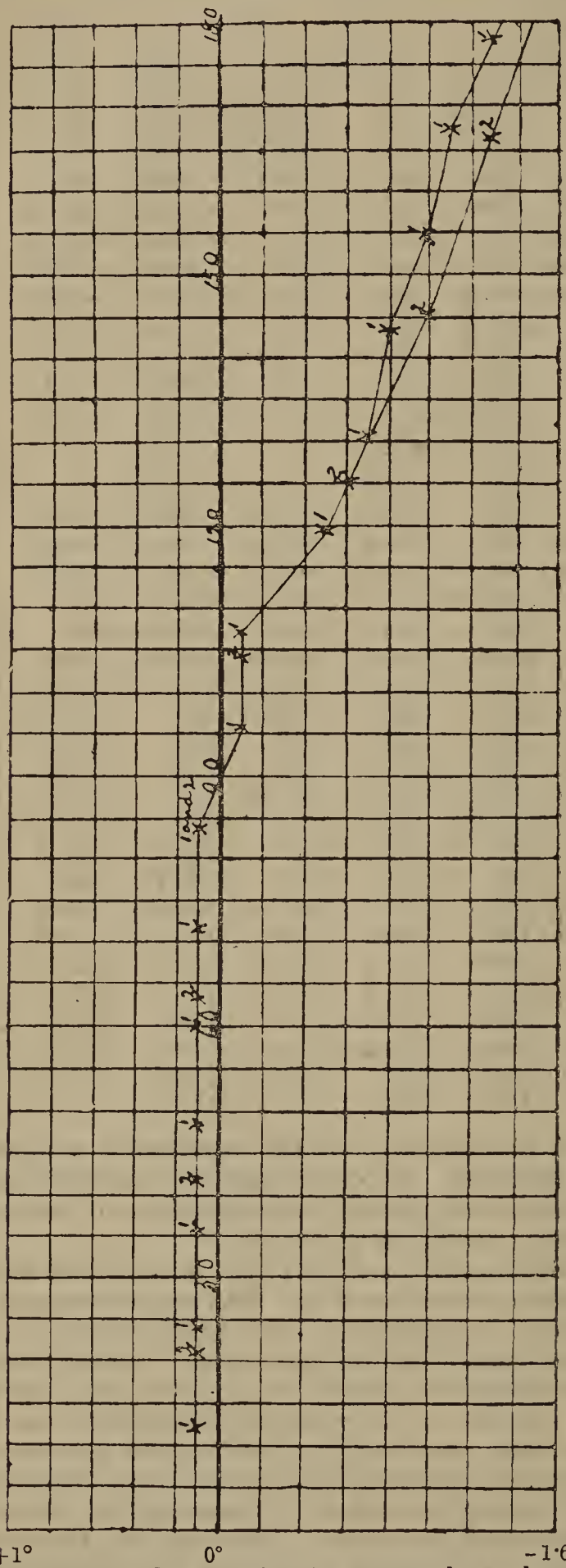
The boiling point was then determined by exposing the thermometer to the vapour of boiling water contained in a long-necked flask. Steam was allowed to escape through a piece of glass tubing bent at right angles, passing through the cork. The top of the mercurial column remained constant for about fifteen minutes at 100·3° ; the barometer was then read, and indicated a pressure of 770·5 mm. As water boils at 100° only under a pressure of 760 mm., the true point was calculated ; it has been observed that 26·7 mm. above 760 mm. raised the boiling point of water 1°, and the barometric pressure was now 10·5 mm. above 760 mm. The

* Kohlrausch's 'Physical Measurements,' p. 79.

† *Phil. Trans.*, 1836, 578.

true boiling point is therefore at 100·3° – ·39° = 99·91°, or ·09 under the 100° indicated on the scale.

Fig. 2.—Chart showing the result of the calibration of a mercurial thermometer.



The numbers 1 and 2 opposite the crosses show where the end of the mercury column rested in the two experiments.

A column of mercury had now to be detached, and the bore of the tube measured from 0° to as near 100° as possible. The length of this short column should be, if possible, an aliquot part of 100°. A little difficulty was at first experienced in obtaining a column sufficiently short. This was overcome by tapping the upper end and allowing a little mercury to run down the tube; a jerk was then given in a downward direction and another away from the operator. When a short column is separated it may be made shorter by bringing one end of the column contiguous to the remainder of the mercury, then cooling; if it is required longer, heat must be applied. In either case a jerk must be given away from the operator immediately after the heating or cooling. In this way a column of exactly 12° was made to pass step by step from 0° to the point nearest 100°, which was 95·8° after eight columns had been measured. The calibration was then continued to 180°.

0° on the scale has been shown to be ·1° too high; its correct reading is therefore –·1°.

The last reading was 95·8°; assuming the error here to be the same as at 100°, the true reading is 95·8° + ·09° = 95·89.

The value of the space from starting point to finish is readily seen to be 95·89° – the true reading at 0°, which is – 0·1° (this being a minus quantity has therefore to be added) = 95·99°. This space had been traversed by eight columns, therefore the value of a single column or $I = \frac{95·99}{8} = 12°$.

The readings taken at the points which the column successively reached can now be corrected. The true temperature in every case is length of the column or I – error at 0°. Thus at the first point 12°, at which the column rested, the true reading is 12° – ·1 = 11·9°, at the second, 2 I – ·1, or 23·9°, and so on.

A lens was used to take every reading. The exact part of the degree at which the end of the column stood was determined by means of a degree magnified, divided into ten parts, sketched on a piece of paper, which was placed by the side of the degree in which the end fell.

The results are recorded in the tables below; they are projected also into a curve (fig. 2), from which the error at any point of the scale can easily be seen. The accuracy of the method is seen by comparing the results obtained by using, firstly, a column of 12°; secondly, one of 21°. Two columns should always be taken, as they serve to fix the errors at a greater number of points on the scale. The process is not tedious, requiring only three or four hours for its accomplishment. The mean is taken of the two results.

First Experiment.

True temperature.	Scale reading.	Error of scale.
– 0·1°	0°	+ 0·1°
11·9	12	+ 0·1
23·9	24	+ 0·1
35·9	36	+ 0·1
47·9	48	+ 0·1
59·9	60	+ 0·1
71·9	72	+ 0·1
83·9	84	+ 0·1
95·9	95·8	– 0·1
107·9	107·8	– 0·1
119·9	119·4	– 0·5
131·9	131·2	– 0·7
143·9	143·1	– 0·8
155·9	154·9	– 1·0°
167·9	166·8	– 1·1
179·9	178·6	– 1·3

Second Experiment.

– 0·1°	0°	+ 0·1°
20·9	21	+ 0·1
41·9	42	+ 0·1
62·9	63	+ 0·1
83·9	84	+ 0·1
104·9	104·8	– 0·1

True temperature.	Scale reading.	Error of scale.
125·9	125·3	−0·6
146·9	145·9	−1·0°
167·9	166·6	−1·3

Table of Corrections.

0°	−0·1°	70°	−0·1	140°	+0·85
10	−0·1	80	−0·1°	150	+1·0°
20	−0·1	90	0·0	160	+1·1
30	−0·1	100	+0·1	170	+1·25
40	−0·1	110	+0·15	180	+1·4
50	−0·1	120	+0·5	—	—
60	−0·1	130	+0·7	—	—

In order to obtain complete information as to the methods used for the verification of thermometers, I was enabled to watch at the Kew Observatory of the Royal Society the graduation of an instrument intended for a standard. Instead of dividing the interval between the zero and boiling points into 100 parts, without paying regard to the bore of the tube, the following process was employed:—

The thermometer was attached to a dividing-engine, furnished with a micrometer eye-piece, having a cross wire in its focus. One end of a short detached column of mercury was placed in the focus of the micrometer, a screw was turned, until the other end became visible; thus its length was ascertained in revolutions of the screw. This process was repeated until the column had been measured for every length of itself from below 0° to 100°. The length of tube comprised between these latter two points was then ascertained. This was divided by the number of calibrations included in that portion; this gave the mean length of a calibration. The value of this in degrees was ascertained by dividing 100° by its length; the value in degrees of each calibrated portion was then obtained. The tube was then dipped into melted beeswax, contained in a long cylindrical tin, around which steam passed. Afterwards it was again placed on the engine and divided by means of a fine needle point into the requisite number of degrees. These were etched upon the glass by dipping into hydrofluoric acid, and the wax having been melted off, a mixture of lamp-black and oil was rubbed in to fill up the graduation marks.

In another room verification was conducted. The freezing point is ascertained by placing the thermometers in a wooden box filled with powdered ice, from which the water is allowed to drain. Above 0° to 100° verification is effected by fixing about forty instruments and a standard to a revolving stand. This is placed in a copper cylinder filled with water; there is a slit about two feet long in one side of this, glazed with a sheet of glass. Loss of heat is obviated by placing this cylinder in a wooden box, the space between the sides of the box and the cylinder being filled with saw-dust. An aperture in the side of the box is cut out, opposite to the glass plate of the internal vessel. Heat is applied by a boiler which sends heated water to the top of, and receives the cooled water from the bottom of, the water vessel. A handle turns a number of paddle-wheels, which revolve in the centre of the stand; thus the water is thoroughly mixed. When readings are taken the source of heat is removed, and another handle is turned, by which the thermometer frame is turned once round forwards and once backwards. Each instrument is read twice, and the mean of the two readings is taken.

The verification of clinical thermometers has an entire room devoted to it. The apparatus is much the same as that used for ordinary instruments, except that a separate heating arrangement is not used; fewer readings are required, usually about four. Each then has K. O. (Kew Observatory) and a number, succeeding that of the thermometer last verified, etched upon it.

Various forms of Thermometers.—A description is given only of such of which the construction has been modified for some scientific or technical requirement.

1. *Minimum Thermometer.*—Many forms are in use. Casella's consists of an ordinary thermometer, of which the bulb is furnished with an overflow chamber; when a rise of temperature occurs, the mercury expands into this chamber, from which it cannot pass when a fall of temperature takes place. The height of the column in the stem now indicates the minimum temperature reached.

2. *Maximum Thermometer.*—A small plug of porcelain is inserted just above the bulb; the expanding mercury passes this, and when once past, can no longer return; the maximum temperature is thus easily read off.

3. *Six's Maximum and Minimum Thermometer.*—One form consists of a U tube having a bulb at each extremity. Each arm of the tube is half-filled with mercury; one bulb and the remaining portion of the tube above the mercury is filled completely with alcohol; the other bulb is only partially filled with this liquid. A steel index, prevented from falling by a hair tied round it, moves on the surface of the mercury in the side tubes. Should a rise of temperature take place, the spirit in the full bulb expands, causing the mercury to push up the index in the other limb. The reverse of this occurs when a diminution of temperature takes place. The lower ends of the indices nearest the mercury indicate the maximum and minimum temperatures.

4. *Solar Radiation Thermometer.*—When an electric current is passed through a vacuum, the inductive spark is white, filling the whole tube. Any pressure exceeding one-tenth of an inch will not show this effect; if moisture is present, a redness in the light is perceived. These facts are made use of in making solar radiation thermometers. The thermometer is surrounded by a chamber, having a platinum wire near each end. This is made vacuous; the test is then applied and the perfectness of the exhaustion determined.

The instrument is now exposed to the sun's rays, and a true indication of their temperature is given by the height of the mercurial column. Upon the perfect exhaustion of the chamber the accuracy of the thermometer depends.

5. *Immischs' Metallic Thermometer.*—This consists of a minute tube, filled with liquid and fixed at one end; the other end bears on the short arm of a lever, the long arm of which acts by a rack on the pinion forming the axis of the pointer. They are watch shape, one inch in diameter, and very accurate.

6. *Clinical Thermometer.*—Perfection in these seems almost to have been reached. They may be obtained only two inches in length and are sometimes fitted with lens fronts, so that their scales are magnified many times—a great desideratum considering the small size of the instrument.

7. *Fire Alarm Thermometer.*—A thermometer is balanced on a knife edge, a sliding band having

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previously been placed at the temperature which has not to be exceeded. So soon as this temperature is reached, the mercury overbalances the thermometer, and causes its upper end to make contact with the wires of a battery; a bell immediately rings loudly and continuously until attention has been called.

I wish to thank Mr. G. W. Whipple, B.Sc., F.R.A.S., Superintendent of the Kew Observatory of the Royal Society, for allowing me to watch there the methods employed for the verification and calibration of thermometers; also Mr. Hicks, 9, Hatton Garden, for lending me the thermometers to illustrate this paper.

CHEMICALLY PURE NARCEINE.*

BY E. MERCK.

The different statements made as to the melting point of narceine have induced the author to subject this alkaloid to a closer investigation, which yielded some interesting facts that are the subject of the following paper. Narceine, according to Pelletier, its discoverer, melts at 92° C., but according to Hesse it melts at 145° C. The latter statement, notwithstanding that it was corrected by Hesse himself subsequently,† has until lately been looked upon as correct, and consequently has found a place in most manuals. Recently the author has tested samples of narceine from different sources, chiefly of English origin, and found that by far the greater number melted between 150° and 160°, but that in the most extreme cases the melting points differed by 20°.

Upon recrystallization scarcely any alteration of the melting-point took place, and it was therefore assumed that the alkaloid in some cases contained foreign admixtures. Claus and Ritzefield, as well as Claus and Meixner,‡ had also come to the conclusion that commercial narceine must contain foreign organic matter in small quantity. They state that this can be destroyed by oxidation with permanganate and then removed, by which means, however, a large portion of the narceine is also decomposed. The alkaloid so purified melts at 162° C.

A closer examination of commercial narceine showed that in most cases it did not consist of the free base alone, but contained in addition considerable quantities of salts, probably to be regarded as basic salts. Hydrochloric acid was found, and, more seldom, acetic acid, sulphuric acid, etc. In order to investigate this relation more thoroughly a sample of commercial narceine was specially examined, which corresponding to the majority of preparations, when tested, yielded hydrochloric acid. It reacted neutral, melted at 153° C., and contained 1·06 per cent. of hydrochloric acid. Since the chemically neutral hydrochlorate of narceine should contain 7·3 per cent. of hydrochloric acid, the sample in question, a narceine presumed to be pure, contained 14½ per cent. of hydrochlorate.

In the first place attempts were made to remove the hydrochloric acid by recrystallization from water or 50 per cent. alcohol, since narceine salts, according to previous statements, could be split up by means of boiling water into acid and base. No diminution of the hydrochloric acid was, however, perceptible. Experiments with aqueous solutions, under the addition of ammonium carbonate, or caustic alkalies, gave a preparation free from chlorine, but all these methods involved great loss of substance, since the agents named, when heat is used, exercise a decomposing action upon narceine, and even in the cold retain a considerable quantity in solution. If the free alkali be neutralized, for instance, by means of acetic acid, a portion of the base retained in solution can be recovered, but this preparation still contains chlorine. Similarly a narceine containing chlorine crystallizes out from a hot aqueous solution that has been made alkaline by means of a drop of ammonia, and which during the filtering, cooling, etc., loses its free ammonia. But when the narceine is dissolved in 50 per cent. alcohol, in which it is most easily soluble, the same chlorinated substance crystallizes out even in the presence of free ammonia.

This behaviour stands in contradiction to the assumption hitherto current that narceine is a very weak base, the salts of which readily split up into their constituents. Such a readiness to decompose has indeed a foundation in fact, but it goes only to a certain stage, beyond which a portion of the acid is retained with the greatest energy.

The author then isolated the acid-free base from the most diverse commercial kinds, and found that it usually had a higher melting point than the original material. However, here also differences were manifest; the melting point varied between 160° and 168° C., and mostly the substance began to cake together 5° or 10° below the melting-point. No alteration in the melting-point resulted from repeated recrystallization. It appeared, therefore, that perfectly homogeneous products were not obtained by the removal of the last traces of acid from commercial narceine; the products appeared, on the contrary, to contain organic admixtures in varying quantities.

It was necessary, therefore, to look about for some other means in order to obtain chemically pure narceine, and this was found in narceine hydrochlorate, which can be easily prepared in a state of chemical purity from commercial narceine. It forms short, stout, white prisms, which are soluble in boiling water in all proportions, and melt completely at about 163° C. under decomposition. When submitted to analysis it was found that the salt on being dried during several hours at 90° C. lost 0·4 per cent. in weight. Heated for a longer time at 102° it sustained no further loss, but at 110° it lost 0·3 per cent.; it had however assumed then a yellow colour, consequently decomposition had taken place. The salt therefore crystallizes without water, since one equivalent of water would require a loss of 3·4 per cent. The original loss of 0·4 per cent. would be attributable to enclosed moisture.

The hydrochloric acid determination gave 7·15 per cent.; the formula $C_{23}H_{29}NO_9 \cdot HCl$ requires 7·3 per cent. The salt in question has therefore a composition corresponding to the above formula and is chemically speaking neutral hydrochlorate of narceine. It has a strongly acid reaction and with water swells up voluminously, and at the same time decomposition into free acid, or peracid and basic hydrochlorate takes place. The basic salt so obtained, upon continued treatment with water, gives eventually a preparation neutral in reaction, but which retains energetically a certain quantity of hydrochloric acid, in the manner previously described.

The narceine prepared from pure hydrochlorate, when quite free from acid, is always of the same quality. It melts at 170° to 171° with evolution of gas; two or three degrees lower it commences to cake together. It is recommended however that in taking the melting-point the temperature should not be allowed to rise too slowly, since narceine begins to take a yellow colour below its melting temperature, and the temperature at which it melts is also that at which it decomposes.

In the way above indicated narceine can be prepared from any commercial sample which shall always show the melting-point of 170°–171°. The hydrochlorate can by recrystallization be completely freed from foreign matter, after which it is only

* *Chemiker Zeitung*, April 24, p. 525.
Neues Handworterbuch d. Chemie, vol. iv., p. 676.
Journ. prakt. Chem., 1888, vol. xxxvii., p. i.

necessary to take care that the hydrochloric acid is entirely removed.

Chemically pure narceine, contrary to previous statements, possesses a faintly alkaline reaction, evidence of which can easily be obtained by testing a hot concentrated solution with sensitive red litmus paper. The alkaloid shows very great affinity for acid. In the moist condition it withdraws traces of hydrochloric acid from the air; in the dry preparation an acquisition of this kind is expressed at once in a lowering of the melting point. If the pure base be moistened with acetic acid and then allowed to dry, the residue rubbed to a fine powder will show an acid reaction, even after exposure for weeks to the air, the acetic acid being energetically retained.

For therapeutic use in most cases the author considers that a good commercial specimen, free from meconin, or freed from acid so as not to melt under 165°, abundantly suffices. But if a chemically pure narceine be desired the following must take the place of the present requirements:—(1) It should be free from acid; (2) complete fusion should not take place under 170° C.

KERATIN AND KERATINIZED PILLS.*

BY E. BOURQUELOT.

Under the name "keratin" are designated certain products obtained by exhausting different horny tissues, such as bristles, nails, horn, feathers and epidermal tissue, successively with ether, alcohol, water and dilute acids. Although these present among themselves, according to their origin, differences of composition, they may be classed under the same designation by reason of the chemical and physical properties they possess in common. In the dry state they are all very hygroscopic, but nevertheless they do not swell much in water. If they are subjected under pressure to the action of water at 150° C. they are decomposed, sulphuretted hydrogen being given off.

Keratin swells in cold and dissolves in hot concentrated acetic acid. When boiled in dilute sulphuric acid it is decomposed, yielding leucine, tyrosine and asparagic acid. Keratin swells in alkalies and dissolves in them when heated, and if an acid be added to an alkaline solution sulphuretted hydrogen is evolved.

The centesimal composition of the products designated as keratin, so far as they have been studied up to the present, varies within the following limits:—C. 50·3–52·5; H, 6·4–7; N, 16·2–17·7; O, 20·7–25; S, 0·7–5. It would appear from their composition that these products are intimately related to the albumenoid substances.

Keratin has been employed and recommended by Unna and Beiersdorf for the making of "keratinized pills" or "pills for the small intestine." Pills coated with a layer of keratin, which is insoluble in the gastric juice, are not dissolved until they reach the intestines, when they come under the action of the alkaline bile which dissolves the keratin.

The medicines which may advantageously be administered under this form are rather numerous. Among them may be mentioned:—

(1) Medicines that can by prolonged contact cause irritation to the mucous membrane of the stomach: arsenic, salicylic acid, creasote, chrysarobin, quinine compounds, copaiba balsam, cubebs, ferriginous preparations and especially perchloride of iron, opium, mercurial preparations and especially biniodide and bichloride of mercury, phosphorus and all the tænifuge preparations.

(2) Medicines that can injure the digestion by giving insoluble precipitates with pepsin and peptones: tannin, alum, acetate of lead, preparations of bismuth, nitrate of silver, corrosive sublimate, etc.

(3) Medicines that are rendered inactive or decomposed by the gastric juice: alkali, bile, soap, sulphide of calcium, sulphide of iron, pancreatin, etc.

(4) Medicines which should arrive in the intestines as concentrated as possible: kousso, santonin, extract of male fern, alkali.

For the preparation of a solution of keratin suitable for the coating of pills several formulæ have been proposed, in all of which either acetic acid or ammonia figures as a solvent. As however certain medicines are modified or decomposed by one or other of these substances a choice of formula should be made according to circumstances. For instance, the acetic solution might be used for coating pills containing salts of mercury, gold or iron, arsenic, creasote, salicylic acid, tannin, alum, etc. On the other hand, an ammoniacal solution might be had recourse to for pills containing pancreatin, trypsin, bile, alkalies, sulphide of iron, etc. For certain other substances, such as naphthaline, it is immaterial which of the solutions is used.

Keratin is prepared by Unna by steeping parings of horn in a digestive liquid composed of pepsin, 1 gram, hydrochloric acid, 1 gram, and water, 11 grams, as long as the shavings yield anything to the solvent. The residue is then dissolved in ammonia by maceration lasting several weeks, after which the solution is evaporated.

Gissmann boils the quills of birds' feathers in glacial acetic acid for twenty-four to thirty-six hours in a retort furnished with a return condenser. A thick yellow-brown liquid is thus obtained, which is filtered through glass wool, evaporated on a bater-bath to the consistence of an extract and afterwards dried.

Dieterich employs Gissman's process, but before the treatment with acetic acid he subjects the feathers to ten hours' digestion in water and then to eight days' maceration in a mixture of equal weights of ether and alcohol, to eliminate fatty matters and cholesterin.

Keratin obtained by one of the foregoing processes is dissolved with the aid of a gentle heat either in acetic acid or ammonia and the solution is allowed to clear by standing. Fischer recommends the employment of 7 parts of keratin with either 100 part of acetic acid or a mixture of equal parts of ammonia and dilute alcohol.

If the pill mass should contain water the pills would shrink and fissures would be produced in the keratin coating. It is therefore recommended to use in the making of these pills a mixture of yellow wax, 1 part, and suet or cacao butter, 10 parts. It is also necessary to avoid the use of vegetable powders and to employ in their place, kaolin or charcoal powder.

When the pills are finished they should be dipped in cacao butter, rolled in charcoal powder and then keratinized. For this purpose the pills, placed in a porcelain capsule, are sprinkled with a suitable quantity of keratin solution and then shaken together until the evaporation of the solvent. This moistening and drying requires to be repeated several times (as many as ten) before the layer of keratin is sufficiently thick.

The process employed for coating pills with gelatin, which consists in dipping into the solution the pill fixed on the point of a needle, is not suitable here, for it leaves a hole through the keratin coating that can never be completely closed.

In order to ensure that the keratin used is insoluble in the stomach Unna recommends that a preliminary experiment should be made with sulphide of calcium pills coated with it. If in the course of some hours after such pills are taken eructations of sulphuretted hydrogen are observed, it would indicate that the pills have been dissolved in the stomach. When the keratin is of good quality nothing of the kind should occur. Finally, to complete the test, the pills when placed in water should not liquefy or crack.

* From the *Journal de Pharmacie et de Chimie*.

PURE CHLOROPHYLL.

It has long been known that the ordinary green colouring matter of leaves is a mixture of two substances, chlorophyll-green and chlorophyll-yellow, in varying proportions. Professor A. Hansen claimed some time ago to have separated pure chlorophyll-green; but Dr. A. Tschirch maintained that Hansen's substance was a compound of chlorophyll and sodium. Dr. Hansen now concedes this, but believes that he has more recently succeeded in separating pure chlorophyll-green by the following process.

Grass-leaves were boiled in water for from a quarter to half an hour, then washed in water, pressed, and dried in the dark. The chlorophyll pigment was then extracted with boiling alcohol, and the solution saponified by heating for three hours with a slight excess of caustic sodium. The excess of sodium was then converted into carbonate by carbonic acid, and the mixture thus obtained dried in a water-bath. The chlorophyll-yellow was then extracted with ether, in which the compound of chlorophyll-green with sodium is quite insoluble, and then with a mixture of equal parts of alcohol and ether, in which it is only slightly soluble, and the residue extracted again with a mixture of equal parts of alcohol and ether and phosphoric acid. This sets free the chlorophyll, which dissolves in the mixture of alcohol and ether, and can be evaporated as a shining black-green perfectly solid brittle substance, insoluble in water, benzol, and carbon bisulphide, soluble with difficulty in pure ether, easily in alcohol. The solution has a beautiful pure green colour, which becomes red and strongly fluorescent when concentrated. It offers great resistance to reagents, especially mineral acids. Its exact composition has not been ascertained, but it contains iron and nitrogen.

Pure chlorophyll-yellow can also be obtained by a different process from grass-leaves. It crystallizes in orange-red crystals insoluble in water, but soluble in alcohol, ether, chloroform, and benzol, with a dark yellow, in carbon bisulphide with a red colour. Dr. Hansen states further that the yellow colouring matter of flowers and fruits, and that contained in the petals of the poppy, is identical with the chlorophyll-yellow of leaves. As regards the mode in which chlorophyll occurs in the living cell, the green substance which fills up the vacuoles of the chlorophyll grains is not a solution, but consists of combinations of the two chlorophyll-pigments with fatty acids, which possess a half-solid consistence.

In a recent publication* Dr. Hansen gives a detailed account of the observations on which the above conclusions are founded, and a very useful *résumé* of the literature of chlorophyll.

RAILWAY AND CANAL TRAFFIC ACT, 1888.

The following circulars have been issued by the Board of Trade in reference to recent proceedings under the Railway and Canal Traffic Act:—

Board of Trade,
(Railway Department),
London, S.W.,
June 10, 1889.

The Railway and Canal Traffic Act, 1888.

Sir,—I am directed by the Board of Trade to inform you that as the time for lodging objections to the proposed classifications and schedules of maximum rates has now expired, they consider that an attempt should be made, in compliance with Sub-section 3, Section 24 of the Act, to arrange the differences which have arisen.

The Board of Trade find that the objections divide themselves into two principal classes:—

First.—Objections on principle, such as to the allowance of station and service terminals, to the short distance charges, and to maximum rates by passenger trains.

Secondly.—Objections on matters of detail mainly arising on the classification, and in general relating to the separate interests of each objector.

The first class of objections can only be dealt with by the Board of Trade, inasmuch as there is no controlling authority representing the objectors, with whom negotiations could be conducted.

But as regards the second class, it appears that time might be saved if discussions could take place between the Traders and Associations who have lodged objections and representatives of the Railway Companies.

With this view, the Board of Trade have prepared and issued to all objectors, the Circular, of which a copy is enclosed.

In the Circular, the objectors are requested to place themselves in communication with the Company or Companies interested, with a view to arranging, where possible, differences upon matters affecting the classification, reserving questions connected with the Schedules of Rates, and the General Conditions for future consideration.

I am desired to invite the co-operation of your Company in this course, to draw your attention to the last paragraph of the Circular, and to request that you will arrange for interviews between your representatives and the several objectors in the locality of the latter.

I am, Sir, your obedient servant,
COURTENAY BOYLE.

The Secretary, *Railway Company.*

Board of Trade,
(Railway Department),
London, S.W.
June 10, 1889.

The Railway and Canal Traffic Act, 1888 (*Section* 24. *Classification of Merchandise and Schedule of Maximum Rates and Charges*).

With reference to the objection which has been lodged by you under the above Act, I am directed by the Board of Trade to state that they consider that an attempt should now be made, in compliance with the provisions of Sub-section 3, Section 24, to arrange the differences which have arisen.

I am accordingly to request that you will place yourself in communication with the railway company or companies concerned, with a view to arranging, where possible, the differences arising upon the classification, reserving for future consideration by the Board of Trade those differences which relate to the proposed schedule of maximum rates and to the general conditions.

If any arrangements be arrived at, the Board of Trade will be glad to receive particulars of such arrangement. If, on the other hand, no arrangement can be effected, the Board of Trade would wish a concise statement of the points at issue to be prepared by the company or companies and the objectors.

The particulars of the arrangement arrived at, or the statement of the points at issue, as the case may be, should be forwarded to the Board of Trade not later than the 1st day of August next. The Board of Trade will then consider the objections which have not been satisfactorily dealt with, and will, where necessary, arrange for a formal hearing, of which due notice will be given.

A similar communication, of which a copy is annexed hereto, has been addressed to the railway companies; and I am to point out that they have been requested to arrange for an interview in your own locality, between you and an authorized representative on their behalf.

I am, your obedient servant,
COURTENAY BOYLE.

* 'Die Farbstoffe des Chlorophylls.' A. Hansen, Darmstadt, 1889.

The Pharmaceutical Journal.

SATURDAY, JUNE 22, 1889.

Communications for the Editorial department of the Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. RICHARD BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

STATE PROTECTION OF PHARMACY.

THE practice of pharmacy in the northern and eastern part of Europe presents a marked peculiarity as compared with the conditions obtaining in the south-western portions in being subject to limitation in such a manner that the number of pharmacies is regulated according to the requirements of the population, and the advantages of that system have recently been made the subject of a letter addressed by Herr von WALDHEIM to Professor CARLES at the request of the latter. The writer is in favour of the system of limitation, and he seeks to show first that the free practice of pharmacy entails great detriment to the pharmacist as well as the public and the medical profession; secondly, that there is in most European countries a tendency to the system of limitation, and even in countries like Austria, where that system is already in force, a disposition to augment the restrictions affecting the practice of pharmacy. Lastly he recommends the pharmacists of France in their own interest to demand from the Government such a limitation of pharmacies as being, in his opinion, the sole means of restoring the profession from the unfavourable condition in which it now is. In support of these views reference is first made to the trade in pharmaceutical specialties, and it is assumed to be an established fact that pharmacy suffers enormously from the trade in these articles, including secret remedies, etc., which are produced almost entirely in countries where the practice of pharmacy is unrestricted. The damage thus done is considered to be, from a moral point of view, even greater than in its material aspect, by giving rise to irritation and even hostility towards pharmacists on the part of medical men, who see that their interests and just claims are interfered with. As a proof of the justice of this statement the writer refers to the numerous attacks made upon the trade in specialties at the various pharmaceutical congresses; for instance, that by Professor BOUDET at the International Congress at Paris in 1867, that by Dr. CROQ at the Brussels Congress in 1885, and that by Dr. KRATSCHMER at the International Congress of Hygiene at Vienna in 1887. On these occasions the trade in secret remedies was condemned as being detrimental to medical men and degrading to pharmacists, and that view was warmly applauded by audiences comprising physicians and pharmacists belonging to all the nations of Europe. In consequence of these attacks upon the trade in secret remedies, the importation of such articles into Russia has been prohibited, and in Germany pharmacists have been prohibited from selling them. A similar course will probably be taken in Austria and Hungary. Since these specialties are to a great extent of French origin, it is considered that the prohibition of their sale in the three countries above-named will necessitate a limitation of the number of pharmacies in France, and in place of the illegitimate trade that has been carried on the following advantageous results may be expected to follow, viz., an assured existence for each pharmacist and a consequent improvement in the position of the whole body, as well as greater security that medicines are prepared in the best possible manner, and that their cost will be reduced to the minimum.

As a set-off to these advantages, both to the public and to pharmacists, it is admitted that the position of apprentices and assistants would be more difficult under the system of limitation they would have to wait longer before being able to secure a business; but that necessity would be known beforehand, and if they preferred pharmacy to any other occupation this condition would not be one to deter them from entering upon it. Another condition that obtains under the system of limitation, that of inspection of pharmacies, might also be regarded as disadvantageous, but Herr WALDHEIM considers that it would be fully compensated for by the greater State protection enjoyed by the pharmacist, and also by the more intimate relations between medical men and pharmacists which would result. He is of opinion that the subordination of pharmacy to medicine, which is by no means unnatural, would in no way be incompatible with the free exercise of pharmacy.

The views expressed on this subject are not likely to meet with very general concurrence in this country, and the Editor of the French journal in which the letter is published does not consider that they will receive approval in France. Although it is admitted that in some respects the system of limitation might prove advantageous to individual pharmacists, it is also shown that such an argument for its introduction would not be likely to carry much weight with the Government. Moreover the strict regulation of the practice of pharmacy in countries where the system of limitation is in force is considered to be opposed to rather than an encouragement to progress. Where innovation and improvement are not permitted, individual initiative would be paralysed. But as it is pointed out it has been in countries where the practice of pharmacy is unrestricted that most of the inventions useful to the public have been made. Capsules, perles, mustard leaves, etc., are mentioned as having been introduced under such conditions and not in countries where the restrictive system prevails. Hence it is held that a Government careful to secure the interest of the general public would be more likely

to oppose any attempt to bring the limitation of pharmacies into operation than to give a favourable ear to those who think the future of pharmacy can be improved by such means. In this country there are probably few who hold such an opinion, though the evils of overcrowding are not few.

At a meeting of the Executive Committee of the British Pharmaceutical Conference held last Thursday, the local arrangements that have been made for the meeting at Newcastle-upon-Tyne next September were adopted with some slight amendment, and we hope soon to be in a position to inform our readers as to the details of the programme.

* * *

A general meeting of the contributors to the Bentley Testimonial Fund was held at 17, Bloomsbury Square, on Wednesday, June 19, Mr. Michael Carteighe in the chair. The Honorary Secretary presented a report, in which he stated that after payment of all expenses he had been able to hand over a balance of upwards of £324 to Professor Bentley. A financial statement duly audited was received and adopted. Votes of thanks were passed to the Chairman for presiding at the various meetings, to the Honorary Treasurer and Secretary, Mr. Plowman ; to the Council of the Pharmaceutical Society for the use of their house, and to the Society's Secretary, Mr. Bremridge, for the general assistance he had so kindly given to the Executive Committee.

* * *

As a preliminary result of the representations that have been made to the Board of Trade in reference to the proposed new classification of railway rates under the new Railway and Canal Traffic Act circulars have been issued by the Board to railway companies and to the various bodies by which objections have been raised to the new classification. It is suggested that an attempt should now be made, in compliance with sub-section 3, section 24 of the Act, to arrange the differences that have arisen, and objectors are requested to place themselves in communication with the railway companies with that object. Both of the circulars referred to appear in this number of the Journal.

* * *

On Tuesday last, a meeting of the Railway Rates Committee was held at the Westminster Palace Hotel, when the circulars issued by the Board of Trade to objectors and to railway companies were considered, and a resolution was passed to the effect that it is undesirable to enter upon any local and separate action until after the Board of Trade shall have dealt with all the questions of principle there are in dispute, the settlement of which will tend to determine many of the details which are dependent thereon.

* * *

A not unimportant question in connection with the copyright of the Pharmacopœia has been under the consideration of the Committee. It appears to have been raised consequently upon the issue of a prospectus of a proposed publication of an annotated British Pharmacopœia, which in the opinion of the Committee, if carried out, would constitute an infringement of the copyright in the work vested in the General Medical Council. The intending publisher has been therefore warned, and it is believed the book will not be issued. The report did not specify in what respect the proposed work would have differed from other annotations of the Pharmacopœia that have not been interfered with; but, according to the *Lancet*, Mr. Macnamara, in seconding its adoption, while admitting that he and others had republished the Pharmacopœia, said that they had included it in works of a fuller character and more expensive, which were not likely to interfere with the sale of the original work, while the republication complained of was to have been issued at a lower price and in the same type as the original.

* * *

A change in the practice of the bullion trade, by which the dimensions of gold ingots have been considerably increased, has raised a question of some financial, as well as scientific, interest. Hitherto the usual weight of ingots imported has been two hundred ounces, but the recent increase of this weight to four hundred ounces necessitated an application from the Bank of England to the Mint authorities to receive ingots of that size. The answer to the application depended upon the determination of the question whether ingots of so large a size could be relied upon as being homogeneous, a most important point in respect to the selection of portions for assay purposes. It is well known that on the cooling of certain alloys after melting a separation of the constituent metals takes place, causing inequality in the composition of the mass. In the cases of bismuth-lead and zinc-lead alloys the separation of the constituent metals into distinct layers is almost complete, whilst in the cooling of alloys of silver and copper also the "liquation" is very marked. On the other hand the metals with which gold is usually associated have been considered to distribute themselves uniformly throughout the precious metal, so that the gold alloys used for coinage have been universally accepted as homogeneous. The result of a crucial experiment made with a gold ingot of the fineness of 984·7, the alloying metal being silver, appears to confirm this opinion, and to prove that gold of high standard, at least, does not, like silver, show any marked tendency to reject during solidification the baser metal with which it may be associated. The application to receive the larger ingots was therefore acceded to.

* * *

From the Sixth Annual Report of the Comptroller of Patents, Designs and Trade Marks, just issued, it appears that during the year 1888 the applications for the registration of trade marks numbered 13,315, being an increase of 2731 on the number of the previous year. During the same time 6513 trade marks were advertised and 5520 registered. Of the 5520 trade marks registered, 524 were intended to apply to articles in the three classes that include chemical substances used in manufactures, in agriculture, and prepared for medicinal and pharmaceutical purposes; 146 for mineral and aërated waters; 432 for fermented liquors and spirits; and 194 for perfumery.

* * *

The annual general meeting of the School of Pharmacy Students' Association, to receive the report of the Executive Committee on the work of the session, will take place on Thursday, June 27, Professor Attfield, F.R.S., President, in the chair.

Transactions of the Pharmaceutical Society.

MEETING IN EDINBURGH.

ELECTION OF EXECUTIVE OF THE NORTH BRITISH BRANCH.

A meeting of the members and associates in business of the Society residing in Scotland was held in the Society's House, 36, York Place, Edinburgh, on Wednesday, June 19, at 12 noon. The chair was taken by Mr. William Gilmour, F.R.S.E. Apologies for absence were received from Messrs. Kinninmont, Glasgow, and Nesbit, Portobello.

The minutes of the previous meeting were read and adopted.

The Chairman said that in consequence of the resignation of Mr. Baildon he had been called to fill the office of Chairman. In ordinary course the vacancy should have been filled by Mr. Watt, but the nature of the Chairman's duties made it necessary that he should be resident in Edinburgh. They were all proud, however, to have Mr. Watt as Vice-Chairman and also as a member of the Council of the Society. It was customary at this meeting for the Chairman to make some remarks. They were not in the position of submitting a report to this meeting, but a report had already been forwarded to the Council, and members would have seen it in the pages of the Journal. That report might serve as a basis for a few observations. The first item referred to in it was the examinations. He was sorry to say the failures continued as large as ever. He felt sure the examiners would like to pass every candidate who presented himself, and certainly some improvement in this direction was very desirable. They would all have seen the report of Dr. Stevenson on this subject which appeared the other day in the *Pharmaceutical Journal*. This was hardly the time to enter into anything like a discussion of that report, but he thought he might say that some, at least, of the suggestions contained in it were really practically given effect to by the Board of Examiners at the present time. It was usual, for instance, if a candidate failed in the first subject to send him on to another before deciding to reject him, and in the department of dispensing they had recently extended the time to two hours, so that if a candidate was nervous or failed in the first thing he got to do he might have an opportunity of recovering himself. With regard to the evening meetings, they had been a great success during the past winter. A number of interesting papers had been read, and especially toward the close the attendance had been very encouraging. He trusted they would endeavour to make them as successful during the coming session. A large number of very valuable books of reference had been added to the Library, and he was very glad to see that the interest in it was increasing. The extent to which the Library was appreciated could not be accurately judged of by the number of volumes lent out. It was very largely taken advantage of by local men who called to consult books of reference. In these times of rapid advance and the introduction of many new remedies, a good library was of the very highest importance, because it was only by having such a place to consult representative books that they could keep themselves thoroughly abreast of the times, and it was only by doing so that they could hold their own at the present day. With regard to the Museum, its advantages were necessarily confined to a considerable extent to local pharmacists. He thought, however, it should be looked upon as a desirable and convenient place of call for all pharmacists visiting the city. It was very largely taken advantage of, and the number of specimens was constantly increasing. There had been nothing of unusual interest occurring during the year. They had, as an executive, been brought in touch with the extreme north and the extreme south. At the recent Jubilee meeting of the Association in Aberdeen he had had the honour of being present as Chairman of the Executive to represent the Society. He was very much gratified by the cordial reception he received, and he thought the meeting then held would give a fresh impetus to the local Association which would carry it forward successfully for another fifty years. At the recent meetings in London three members of the Executive were present. They were very cordially received by the President and others, and it was felt that it would be wise if every year a representation from the North were to attend the annual meetings in London. With regard to the result of the election which would shortly be laid before them, it was gratifying that while there had been a slight decrease in the total number of voters connected with the Society, in Scotland they appeared at least to be holding their ground, the number of voting papers issued this year being the same as last time. The number of voting papers returned showed a decrease of interest and an apathy which was probably due to the fact that there was no burning question at present before the electors. The fact that less than one-half of the electors do not take the trouble to return the voting papers, indicated a want of interest in the affairs of the Society which was very much to be regretted. In Scotland there were a large number who might be, but are not, connected with the Society. Complaints were frequently heard as to the Society not doing what it should. It ought always to be remembered that the Society is just what the members themselves make it. He would like to press this point very strongly, and he thought not only that those already connected with the Society should take a greater interest in the management of its business, but that there should be a large addition to its numbers from those who were at present outside. If they had, as they might have in Scotland, a much larger representation of registered chemists connected with the Society, they could then fairly demand a larger number of councillors to represent them on the Council of the Society. They ought at least to have two representatives from Scotland, and if they were more united he thought they would even be entitled to three. As for the policy of the Council, which was sometimes so much objected to, he did not see why the registered chemists of the country should not be able to send to the Council men prepared to support a good active opposition. Such an opposition would do the Council good, and he for one would be glad to see a good Radical opposition having a place in the Council meetings just as it had in the parliamentary arena. But to have this they must have a new recruiting of members on a large scale, and he trusted that this would come about and that members would take more interest, and many who were at present outside would join the ranks. Before closing he would like to refer in a sentence to the fact that two of those who had for some time been associated with them on the Executive had not seen their way to accept nomination this year. These were Mr. Kermath, of St. Andrews, and Mr. Mackay, of Edinburgh. He had learned with very great regret, and he was sure all his colleagues did so too, that Mr. Kermath had not consented to stand again. He had been associated with him for a number of years, and had learned to esteem him very highly, because of his intelligence and business capacity, and he had all along taken a deep interest in the affairs of the Society. Owing to business engagements, Mr. Mackay had never been able to take so active a part in their proceedings, and he regretted that it was on this account that he felt constrained to decline nomination on this occasion. He thought they

ought to express their thanks to both these gentlemen for the services they had rendered.

Mr. Watt said he had not intended making any speech, but the remarks just made by the Chairman suggested some points on which he might say a word or two. In the first place he would like to say very distinctly that he had all along had a most earnest desire that the Executive there should remain on the best terms with the Council of the Society, and he was gratified to be able to tell them that the Council had the highest opinion of the attention and the accurate manner in which the business in Scotland was conducted by the Executive, and he need hardly tell them that their Chairman had the entire confidence of the Council. When he first entered the Council he had set his mind on the prosecution of certain reforms, and as he quite expected, he did not receive very much support in the discussions, which took place mostly in committee, so that they in Scotland did not see much of what he put before the Council. He did not hesitate to declare publicly that the President of the Society and he were in direct opposition. The President held that the Society was specially educational in its objects, while he held that in this the President was mistaken. He maintained that there were trade interests which the Society ought to consider and conserve, and that view he intended to press. He felt that unless these trade interests were adequately considered and attended to, the Society would cease to exist, and therefore trade interests must also command attention. There was one question materially affecting the trade at present under consideration, but as it was one of a legal nature he could not refer to it in public. Complaints were sometimes made against the Council for not taking up cases of prosecution and not attending to the complaints received. As to that he must frankly say that every case brought before the Council was very thoroughly examined, and no blame could be rightly attached to the Council on this ground. As to the healthy opposition referred to, he had no desire to oppose, but holding the views he did, he must of necessity be in opposition to the present policy of the President. He had frequently had to consider what would be the views of the members in Scotland, and on many occasions had checked himself when he felt inclined to go further than probably the majority of the Scottish members would be inclined to go. He had also been in the habit of consulting Scottish members in whom he had confidence as to the course he ought to follow, and it would always be his endeavour to carry out the views of those whom he represented. Since entering the Council he had received from members of Council, and especially from the President, the utmost courtesy and the greatest attention to all that he had brought before them.

The Assistant-Secretary then read the report of the Scrutineers as follows:—

"*Scrutineer's Report.*

"At the meeting held on April 24, the Executive appointed June 19 as the date of the election for the ensuing year. Three hundred and four nomination papers were issued by the Assistant-Secretary on May 22.

"The nomination papers returned showed that forty-six members and associates in business had been nominated, of whom the following twenty-one signified their willingness to act if elected:—

Boa, Peter, 119, George Street, Edinburgh.
Coull, George, 17, Smith's Place, Leith Walk, Edinburgh.
Fisher, John Hutchison, 66, High Street, Dunfermline.
Frazer, Daniel, 127, Buchanan Street, Glasgow.
Gibson, Adam, Thistle Street Lane, East, Edinburgh.
Gilmour, William, 11, Elm Row, Edinburgh.
Hardie, James Millar, 68, High Street, Dundee.
Jamieson, Simpson, 9, Crossgate, Cupar, Fife.
Kerr, Charles, 56, Nethergate, Dundee.
Kinninmont, Alexander, 69, South Portland Street, Glasgow.
Lawrence, Samuel, 101, George Street, Oban.
Maben, Thomas, 5, Oliver Place, Hawick.
M'Adam, Robert, 34, Virginia Street, Glasgow.
Mackenzie, James, 45, Forrest Road, Edinburgh.
Nesbit, John, 162, High Street, Portobello.
Paterson, James, 15, Regent Quay, Aberdeen.
Stephenson, John Bertram, 48, Frederick Street, Edinburgh.
Storrar, David, 228, High Street, Kirkcaldy.
Strachan, Alexander, 138, Rosemount Place, Aberdeen.
Thompson, Thomas, 35, George Street, Edinburgh.
Thomson, Isaac William, 4, Bellevue Street, Edinburgh.

"A voting list was accordingly drawn up, and on June 8 three hundred and four voting papers were issued.

"The Scrutineers met last night at 8.30, and proceeded to examine the voting papers. The result was found to be as follows:—

Voting Papers issued	304
,, ,, returned	137

"There were thus 137 votes to be recorded.

"The following gentlemen have a majority of votes:—

Boa, Peter, 119, George Street, Edinburgh.
Fisher, John Hutchison, 66, High Street, Dunfermline.
Frazer, Daniel, 127, Buchanan Street, Glasgow.
Gibson, Adam, Thistle Street Lane, East, Edinburgh.
Gilmour, William, 11, Elm Row, Edinburgh.
Hardie, James Millar, 68, High Street, Dundee.
Kerr, Charles, 56, Nethergate, Dundee.
Kinninmont, Alexander, 69, South Portland Street, Glasgow.
Lawrence, Samuel, 101, George Street, Oban.
Maben, Thomas, 5, Oliver Place, Hawick.
M'Adam, Robert, 34, Virginia Street, Glasgow.
Mackenzie, James, 45, Forrest Road, Edinburgh.
Nesbit, John, 162, High Street, Portobello.
Paterson, James, 15, Regent Quay, Aberdeen.
Stephenson, John Bertram, 48, Frederick Street, Edinburgh.
Storrar, David, 228, High Street, Kirkcaldy.
Strachan, Alexander, 138, Rosemount Place, Aberdeen.
Thompson, Thomas, 35, George Street, Edinburgh.

"The voting papers and all other documents are submitted herewith.

(Signed) "William Gilmour, *Chairman.*"

The above gentlemen, together with the President of the Scciety (Mr. Michael Carteighe), the Vice-President of the Society (Mr. Alexander Bottle), and James Watt, sen., of Haddington, as *ex-officio* members, will therefore form the Executive for 1889–90.

The actual result of the poll was as follows:—

Kinninmont	130	Fisher	113
Boa	128	Gibson	111
Strachan	128	Lawrence	106
Gilmour	127	Mackenzie	103
Storrar	126	Kerr	96
Hardie	121	McAdam	91
Maben	119	Thompson	68
Paterson	119	Jamieson	66
Stephenson	119	Coull	61
Nesbit	118	Thomson	38
Frazer	115		

The Chairman said there were no informal papers this time, but one had been received that morning, and was therefore too late to be included in the enumeration.

Mr. Hutcheon, Bonnyrigg, moved the adoption of the report.

Mr. Walker, Edinburgh, seconded the motion, which was unanimously agreed to.

On the motion of the Chairman, a vote of thanks was awarded to Messrs. R. Aitken, J. L. Ewing, C. F. Henry, and J. Robertson, for their services as scrutineers.

Mr. Watt, Haddington, moved a vote of thanks to the Chairman, which was passed with acclamation.

The meeting then closed.

Proceedings of Societies in London.

CHEMICAL SOCIETY.

Faraday Lecture.

The distinguished chemist invited by the Chemical Society to give the Faraday Lecture was this year Professor Mendeleef, and the proceedings took place on Tuesday, the 4th inst., in the lecture theatre of the Royal Institution. Unfortunately, however, Professor Mendeleef himself was not present, having been suddenly recalled to Russia by a telegram announcing the sudden dangerous illness of his child, which necessitated a very severe operation. The Chairman, Dr. Russell, read a letter from Professor Mendeleef, expressing his deep regret at his unexpected absence.

The lecture was therefore read by Dr. Armstrong. It gave an account of the discovery and development up to the present time of the periodic law. The earliest observations on the apparent relation to each other of some of the atomic weights were made in the case of closely allied elements, such as the halogen group, but for some time later no attempt was made to include other dissimilar elements in the series, and therefore no generalization could be made. A more complete series was elaborated by Newlands, who discovered the germ of the periodic law which has since become such a useful and powerful engine for the use of the chemist. The lecture described how the law was gradually developed and amplified, until the author was able to predict the discovery of elements as yet unknown, and not only their existence, but even their properties, chemical and physical. How his predictions have been verified in the cases of scandium, thallium and germanium for instance, is well known.

A long table of the elements arranged in the order of their atomic weights, with their quantivalence for oxygen on one side and for hydrogen on the other, showed their periodicity in a manner somewhat different to any previously published. A space as yet unfilled was shown here and there, but between didymium and its next neighbour there was room for no less than fourteen new elements, a fact which agreed remarkably with recent researches by Crookes and others on the elements of the rare earths of that group. In tracing the rise of the theory it was shown how objections were raised to it on various grounds, but were finally overcome. One of the strongest objections was in the case of beryllium, which was considered from the analogy of its oxide with that of aluminium to form an oxide of the formula Be_2O_3, which would make its atomic weight a little over 13, and place it between carbon and nitrogen, where there was no room for an element with the properties of beryllium. Later, however, it was proved from the vapour density of the chloride that the correct formula of the oxide was BeO, corresponding with the atomic weight 9, and placing it in a position in the periodic scale which its properties exactly indicated. Again in the case of gold, platinum and osmium, the atomic weights did not coincide with their position in the system, but a careful re-determination of the atomic weights of these elements had shown that the numbers previously assigned to them were at fault, and that the correct ones agreed perfectly with the law. So well is the law now established that it is used for checking the accuracy of determinations of atomic weights, and the atomic weight of uranium has been changed from 120 to 240 for no other reason than to make it conform with the periodic law.

Speculations as to the really elementary nature of the elements, the analogy of their periodicity to that of homologous series of carbon compounds, and the existence of a really primary elementary matter, helium, from which the bodies we at present consider elements might be derived, were also touched upon.

At the conclusion of the lecture a vote of thanks to the author was proposed by Dr. Frankland, seconded by Sir Frederick Abel, and heartily endorsed by the audience. The Faraday medal, accompanied by a purse, was then presented by the Chairman, and received on behalf of Professor Mendeleef by Mr. Anderson, who expressed the very great sorrow Professor Mendeleef had experienced in being unable to receive it personally.

An ordinary meeting of the Chemical Society was held on Thursday, June 6, Dr. W. J. Russell, F.R.S., President, in the chair.

The following papers were read:—

Experimental Researches on the Periodic Law. Part I. Tellurium. By B. Brauner, Ph.D.—The author gives a detailed account of his attempts to determine the atomic weight of tellurium by as many different methods as possible; in all eleven were adopted, but each gave a different result, varying from 125–140. He eventually succeeded, but with great difficulty, in preparing what appeared to be pure tellurium tetrabromide, and on most carefully analysing this, obtained the value Te=127·64 (O=16). This number, however, is incompatible with the position of tellurium in the periodic system, and having satisfied himself that there were no experimental errors which could account for the discrepancy, the author was forced to conclude that what had hitherto been regarded as pure tellurium contained foreign elements. By submitting tellurium solutions to a systematic fractional precipitation, he has, in fact, succeeded in obtaining a variety of substances, some of which are undoubtedly novel elements. One of these it is proposed to call *Austriacum* (*Austrium*). In all probability this is the *Dvi-tellurium* (212), the probable existence of which was pointed out for the first time by Mendeleeff in his recent Faraday lecture. From analyses made with material the uniformity of which is not yet quite established, the author is satisfied that the atomic weight of the element in question approaches very closely to that indicated by Mendeleef. In addition, there is at least one other novel constituent, and this appears to be more or less closely allied to arsenic and antimony. It follows that true tellurium has yet to be discovered, and that its atomic weight and properties remain to be determined.

Mr. J. Newlands remarked that he had always placed tellurium below iodine; he had no doubt that the exceptional atomic weight would ultimately be rectified, and that true tellurium, when isolated, would be found to have an atomic weight near 125.

The Amylodextrin of W. Nägeli and its Relation to Soluble Starch. By Horace T. Brown and G. Harris Morris, Ph.D.—Amylodextrin, described by W. Nägeli in 1874, is prepared by the long-continued action of cold dilute acids on intact starch-granules; when purified by dissolution in water and precipitation with

alcohol, it forms crystalline spherules, closely resembling the well-known spherules of inulin. Amylodextrin is coloured a reddish-brown by iodine. The values obtained on analysis of the purified substance were—

$[\alpha]j$. . 3·86 206·25° κ . . 3·86 9·07°

which correspond to a percentage composition of—

Maltose . .	14·87	which requires	$[\alpha]j$.	3·86	205·4°
Dextrin . .	85·13		κ . .	3·86	9·07
	100·00				

The substance is shown to be a definite compound: (*a*) by its absolute unfermentability by ordinary top fermentation yeast; (*b*) by the impossibility of differentiating it by fractional precipitation or partial dissolution; (*c*) by its passing through a dialyser in an unaltered form; and (*d*) by its distinct crystalline form. The authors consider amylodextrin to be analogous in composition to the maltodextrin previously described by them (*Trans.*, xlvii., 528), and assign to it the formula $C_{12}H_{22}O_{11}\cdot(C_{12}H_{20}O_{10})_6$; *i.e.*, it may be regarded as constituted of one *amylon* or maltose group in combination with six *amylin* or dextrin groups. A determination of the molecular weight by Raoult's method gave the following numbers:—

	Calculated for $C_{12}H_{22}O_{11}$, $(C_{12}H_{20}O_{10})_6$	Found (mean).
A. . .	0·0096	0·0086
M . .	1962·0	2220·0

Amylodextrin, like maltodextrin, is rapidly and completely converted into *maltose* by the action of diastase. The authors point out that amylodextrin has been confused by former workers with soluble starch, on the one hand, and with the so-called starch-cellulose on the other hand. From these substances it is differentiated by its solubility, its iodine coloration, and its behaviour with diastase and with acids. When acted on by diastase, soluble starch yields a mixture of maltose and dextrin, corresponding to the No. 8 equation of the authors' previous papers, whilst amylodextrin is completely converted into maltose by the same treatment. The authors also show that soluble starch is the first product of the action of cold dilute acids on starch, and that this is slowly hydrolysed to amylodextrin, a portion of the starch substance at the same time going into solution as dextrose.

The Determination of the Molecular Weights of the Carbohydrates. Part II. By Horace T. Brown and G. Harris Morris, Ph.D.—After referring to their former paper on this subject (*Trans.*, 1888, 610), and stating that the results there given have been since confirmed by Tollens and Mayer (*Ber.*, 1888, 1566 and 3508), and by de Vries (*Compt. Rend.*, cvi., 751), the authors give the results of the determination by Raoult's method of the molecular weights of the following carbohydrates:—

Galactose.

	Calculated for $C_6H_{12}O_6$.	Found (mean).
A . . .	0·106	0·1073
M . . .	180·0	177·0

Inulin.

	Calculated for $2(C_{36}H_{62}O_{31})$.	Found (mean).
A . . .	0·0096	0·0087
M . . .	1980·0	2176·0

Kiliani has assigned the formula $C_{36}H_{62}O_{31}$ to inulin, but the authors' results point to the correct value being double this. They have already shown the great similarity between amylodextrin and inulin as regards their physical properties (see preceding abstract), and they are inclined to regard the two substances as closely analogous in composition, thus:—

$\{(C_{12}H_{22}O_{11})_2, (C_{12}H_{20}O_{10})_4\}$; Inulin; M = 1980.

$\{C_{12}H_{22}O_{11}, (C_{12}H_{20}O_{10})_6\}$; Amylodextrin; M = 2286.

although the amylin and amylon groups in each possess very different optical and other properties, and the products of hydrolysis with dilute acid are very different.

Maltodextrin.

	Calculated for $\{C_{12}H_{22}O_{11}, (C_{12}H_{20}O_{10})_2\}$.	Found (mean).
A . . .	0·0191	0·0197
M . . .	990·0	965·0

Starch.—It was found impossible to apply Raoult's method to starch-paste. Solutions of soluble starch produced so slight a depression that no reliable results could be obtained; a number of fairly concordant results, however, pointed to a molecular weight of 20,000 to 30,000. In order to ascertain whether the failure in this case was due to a high molecular weight, and not to the fact that the method was inapplicable to colloid substances, an arabinic acid, having a rotatory power $[\alpha]j = +61{\cdot}16°$, was examined; this gave A = 0·0265, M = 717·0, thus rendering it probable that the small influence exercised by soluble starch was due to its high molecular weight. Indirect evidence was then sought for by an examination of the dextrins. The authors have previously shown that when starch is broken down by diastase, a resting stage in the reaction is reached when the amount of dextrin produced corresponds to *one-fifth* by weight of the starch taken, and that *the molecule of this stable dextrin is one-fifth of the size of the starch-molecule from which it has been derived.* Determinations made with several specimens of this low dextrin gave the following mean values:—

	Mean Values.	Calculated for $20C_{12}H_{20}O_{10}$.
A.	0·0030	0·0029
M.	6221·0	6480·0

and consequently the formula of soluble starch would be $5(C_{12}H_{20}O_{10})_{20}$, and its molecular weight 32,400. The endeavour was also made to apply Raoult's method to the determination of the question whether the dextrins are a series of polymers or whether they are simply metameric. For this purpose a number of the higher dextrins were prepared from starch-transformations which had been stopped at an early stage of hydrolysis. All the numbers obtained show that the freezing method affords no evidence of there being any difference in molecular weight between the high and low dextrins, the numbers being, in fact, almost identical. From a consideration of the results obtained with soluble starch, and with dextrins of varying position in the series, the authors conclude that the evidence points to the conclusion that the dextrins are metameric and not polymeric compounds. They therefore abandon their former working hypothesis of the hydrolysis of starch, and now suppose the starch-molecule to consist of four complex amylin groups, arranged round a fifth similar group, constituting a molecular nucleus. When hydrolysis takes place this complex is broken up, four amylin-groups being liberated, which in turn are capable of undergoing complete hydrolysis into malto-dextrins, and ultimately to maltose, whilst the fifth amylin group which constituted the nucleus of the original molecule resists the action of hydrolysing agents and forms the stable dextrin of the No. 8 equation. Each amylin group of the five has the formula $(C_{12}H_{20}O_{10})_{20}$, corresponding to a molecular weight of 6480; the molecule of soluble starch being represented by $5(C_{12}H_{20}O_{10})_{20}$, corresponding to a molecular weight of 32,400.

Dr. Gladstone remarked that the observations made by Mr. Hibbert and himself on the molecular weights of colloid substances completely confirmed those now brought forward by the authors. He believed Raoult's method to be capable of distinguishing polymers, as

satisfactory results had been obtained on examining polymeric C_5H_8 compounds.

Dr. Armstrong remarked that as both the universal applicability of Raoult's method and the molecular weights of colloids were in question, neither was at present a safe standard. He was not satisfied with the conclusion arrived at in the case of the dextrins.

Researches on Silicon Compounds. Part V. By J. EMERSON REYNOLDS.—The author has already shown that silicon tetrabromide unites with some amidic compounds, especially thiocarbamide, allyl-, phenyl-, and diphenyl-thiocarbamides, without loss of halogen, and produces compounds of the type $(CSN_2H_4)_8SiBr_4$. In this part a detailed account is given of the products of interaction of silicon haloids with excess of aniline, orthotoluidine and paratoluidine, and the three following bodies are described which result from the complete substitution of halogen by NHR-groups derived from the amido-compounds. *Silicotetraphenylamide*, $Si(NHC_6H_5)_4$, a beautiful crystalline body, is obtained from its carbon disulphide solution in fine, monoclinic forms which have been subjected to a determined crystallographic examination by Professor Sollas. *Silicoparatolylamide*, $Si(pNHC_7H_7)_4$, is obtained from its benzene solution in botryoidal masses of fine needles; it is but slightly soluble in ligroin, and therefore is precipitated by it from a benzene solution. *Silicoorthotolylamide*, $Si(oNHC_7H_7)_4$. This differs from the para-compound in being soluble in ligroin. When the mixed benzene and ligroin solution is distilled a very thick, syrupy liquid remains which, after long exposure in a vacuum, gradually affords a quantity of minute needles which do not exhibit any tendency to form aggregations.

The Isomerism of the Alkyl-derivatives of Mixed Diazoamido-compounds. By R. MELDOLA, F.R.S., and F. W. STREATFEILD.

The Atomic Weight of Zinc. By J. H. GLADSTONE, Ph.D., F.R.S., and WALTER HIBBERT.—The authors have observed that when amalgamated zinc is used as anode in a zinc sulphate voltameter, the metal dissolved appears to be free from impurity. This they attribute to the electrochemical relations between zinc and its ordinary impurities, the latter being less readily attacked than the more electropositive metal. Results obtained in different voltameters with the same current showed a very close agreement, and the authors therefore determined the atomic weight of zinc by applying Faraday's law of electrolysis. For this purpose a series of copper, silver and zinc voltameters were arranged in a simple circuit, and the quantity of zinc dissolved was compared with the weights of deposited silver and copper. The results of five experiments are given, but as two zinc voltameters were employed in each, the data afford ten comparisons of the equivalents of silver and zinc, and eight comparisons of those of zinc and copper. The mean ratio of the equivalents of silver and zinc is $3{\cdot}298 \pm 0{\cdot}00008$. Taking the atomic weight of silver as 107·93, this ratio gives 65·44 as the atomic weight of zinc. If silver is taken as 107·66, zinc = 65·29. The copper sulphate voltameter is not so accurate as the silver one, owing to the solvent action of the solution on copper. But by keeping the density of the current within certain limits, this action can be made extremely small. Still the ratio Zn : Cu given by the experiments (1·0322) is probably rather higher than it ought to be. There is also uncertainty as to the atomic weight of copper, but the authors have used W. N. Shaw's value, 63·33. This gives $63{\cdot}33 \times 1{\cdot}0322 = 65{\cdot}37$ as the atomic weight of zinc. The two comparisons indicate 65·3 as being very near the true value. This is higher than the results obtained in recent years by Marignac, Baubigny, Morse and Burton, but lower than that given by Reynolds and Ramsay.

The Amount of Nitric Acid in the Rain-Water at Rothamsted, with Notes on the Analysis of Rain-Water. By R. WARINGTON, F.R.S.—Determinations of chlorine and sulphuric acid have been made in the Rothamsted rain-water for several years, and new determinations of ammonia for five years (*Trans.*, 1887, 501); new determinations of nitric acid are now communicated. The first method employed involved the concentration of 10 lbs. of rain-water with a little magnesia, filtering, and determining the nitric acid as nitric oxide gas by Schloesing's method. This plan gave low results with the stronger rain-waters; the loss apparently took place during the last stage of the concentration, being due to a reduction of a portion of the nitrates by the agency of the organic matter and lead which the water contained. The method finally adopted involves the reduction of the nitric acid to ammonia by means of the copper-zinc couple. One litre of the water is boiled in a retort with magnesia till 250 c.c. have distilled; in the distillate the ammonia present in the water is determined; the residue is diluted to 800 c.c., copper-zinc couple added, and the whole allowed to stand three days at 20-24°; the ammonia present is then determined by distillation and Nesslerising, and its equivalent in nitric acid calculated. The rain of twelve months, analysed by the copper-zinc method, contained an average of 0·138 nitrogen as nitric acid per 1,000,000 of water; this is a little higher than that found by Way in 1855–56, namely, 0·12 per million, but is almost identical with that found by Frankland as a mean of his analyses of Rothamsted rain in 1869–70. In a whole year, 1888–89, with a rainfall of 29·27 inches, the quantity of nitric nitrogen in the rain was 0·917 lb. per acre, and the nitrogen as ammonia 2·823 lbs., or a total of 3·74 lbs. These quantities are compared with those found by other experimenters. A brief account of the methods employed at Rothamsted in determining the ammonia, chlorine and sulphuric acid in rain is then given.

The Product of the Action of Sulphur on Resin. By G. HARRIS MORRIS, Ph.D.—Pelletier and Walter, in 1838, described a solid hydrocarbon which they separated from the products of the distillation of resin; later observers obtained a similar product by distilling resin with sulphur. The author has examined this latter substance. The hydrocarbon separates from its solutions in alcohol, benzene, &c., in pale yellow crystalline scales, which melt at 84—85° C.; it boils without decomposition slightly above the boiling point of mercury. Its composition is expressed by the formula $(C_5H_6)n$; the density determined by Victor Meyer's method, using the vapour of sulphur, was 160·07, whilst $(C_5H_6)_5$ requires 165. From the examination of a number of its derivatives the author concludes that Kelbe is wrong in regarding the substance obtained by the action of sulphur on resin as identical with retene.

The Vapour-pressures and Specific Volumes of Similar Compounds of Elements in Relation to the Position of those Elements in the Periodic System. Part I. By SIDNEY YOUNG, D.Sc.

The Vapour-pressures of Quinoline. By SYDNEY YOUNG, D.Sc.

ROYAL SOCIETY.

On Wednesday evening, the second, or "Ladies'" Conversazione of the Royal Society was held at the rooms, Burlington House, and was very numerously attended. Several objects of considerable interest were shown and their characteristic features explained to the company by the exhibitors. Among them were the following:—

A new form of gas battery was exhibited by Mr. Ludwig Mond and Dr. Carl Langer. This battery is an improvement on the well known gas battery invented by Grove fifty years ago, which produces elec-

tricity from hydrogen and oxygen gas by the intervention of platinum. The distinguishing feature of the new battery, which has been designed to obtain large currents of electricity by means of these gases, is that the electrolyte is not employed as a mobile liquid, but in a quasi-solid form, and it is therefore named "dry gas battery." Each element of the battery consists of a porous diaphragm of a non-conducting material, for instance, plaster of paris, which is impregnated with dilute sulphuric acid. Both sides of this diaphragm are covered with very fine platinum leaf, perforated with very numerous small holes, and over this with a thin film of platinum black. Both these coatings are in contact with frame-works of lead and antimony, insulated one from the other, which conduct the electricity to the poles of each element. A number of these elements are placed side by side, or one above the other, with non-conducting frames intervening so as to form chambers through which hydrogen gas is passed along one side of the element, and air along the other. One element, with a total effective surface of 774 square centimetres = 120 square inches, which is covered by 1 gram of platinum black and 0·35 gram of platinum leaf, shows an electromotive force of very nearly 1 volt when open, and produces a current of 2 ampères and 0·7 volt, or 1·4 Watt, when the outer resistance is properly adjusted. This current is equal to nearly 50 per cent. of the total energy obtainable from the hydrogen absorbed in the battery. The electromotive force decreases, however, slowly, in consequence of the transport of the sulphuric acid from one side of the diaphragm to the other. In order to counteract this disturbing influence the gases are from time to time interchanged. The battery works equally well with gases containing 30 per cent. to 40 per cent. of hydrogen, such as can be obtained by the action of steam or steam and air on coal or coke, if these gases have been sufficiently purified from carbonic oxide and hydrocarbons. The water produced in the battery by the combination of hydrogen and oxygen is carried off by the unconsumed nitrogen and an excess of air carried through it for this purpose.

Professor J. A. Fleming exhibited some Edison-Swan Incandescence Lamps, showing what is known as the "Edison effect." If a carbon incandescence lamp has a platinum plate, carried on a wire sealed through the glass, placed between the loop or horse shoe, it is found when the lamp is in action that a galvanometer connected between the middle plate and the *positive* side of the carbon loop shows a current passing. If the galvanometer is placed between the middle plate and the *negative* side of the loop no current is found. The lamps exhibited show very well this effect, which was first pointed out by Mr. Edison, in 1884. It has been found that shielding the negative leg by a glass or metal tube entirely stops the production of the effect.

Some samples of copper produced by the Elmore Depositing Process were exhibited by Messrs. Woodhouse and Rawson. In this process a burnisher is made to pass over the successive layers of metal deposited by electrolysis, the action having the effect of breaking up the tendency to a crystalline formation, and imparting to the metal a greatly increased tenacity.

Some handsome specimens of electro-plating with the metal cobalt were shown by Professor S. P. Thompson. They were of very good colour, and it was stated that the coating, besides being less oxidizable than one of nickel, is less liable to peel off.

Professor Thompson also showed an interesting experiment illustrating by means of an acoustic arrangement, the polarization of light, and also demonstrated the magnetic rotation of the plane of polarization.

Professors Liveing and Dewar exhibited an apparatus illustrating their recent researches on the absorption spectrum of oxygen. When oxygen compressed to 150 atmospheres and contained in a steel tube fitted with quartz ends is examined spectroscopically it is seen that in the red part of the spectrum there are absorptions corresponding to the Fraunhofer groups A and B. Less sharply defined absorption bands are seen in the orange, citron and blue, and faint bands in the green and indigo. These band absorptions have a totally different character from the great line absorptions of A and B. Beyond the visible spectrum, photographs show some absorptions in the ultra-violet, and the extreme ultra-violet rays are wholly absorbed. This complete absorption extends nearly to the limit of the solar spectrum. This, it is considered, proves that the earth's atmosphere limits the rays which can reach us from the outside. Ozone has even a more powerful absorptive action, and oxygen, ozonized and unozonized, puts a limit to our observations of stellar spectra. Professors Liveing and Dewar have experimented with a steel tube 60 feet in length, and easily capable of holding a mass of oxygen equal to that contained in a vertical column of the earth's atmosphere of equal section.

Mr. John Aitken showed some apparatus for counting the dust particles in the atmosphere, based upon his observations that particles of dust form the nuclei for condensation of vapour. Using two receivers in which steam was mixed with air, he showed that when steam is mixed with the air of a room, it gives rise to the ordinary cloudy condensation; but when steam is mixed with dustless air, no cloudy condensation takes place, because there are no dust particles for the vapour to condense upon. This is held to prove that if there were no dust in the atmosphere there would be neither clouds nor fogs. Another apparatus illustrates the same point in another way. A small glass flask was connected with an air-pump and a cotton-wool filter, and a measuring apparatus was attached by means of which any desired quantity of dusty air might be mixed with the filtered air in the flask, where it was saturated with water vapour. The air in the flask was then cooled by expanding it by means of the air-pump When this was done, condensation took place if there were any dust present. If there were much dust the condensed particles were numerous and small, the receiver becoming packed with a fine fog; if little dust, the particles were few and large, and fell like fine rain; and if no dust were present no condensation took place. The apparatus for counting the dust particles in the atmosphere consists of a receiver, an air-pump, a filter, and apparatus for measuring the air to be tested. A measured quantity of the dusty air is mixed with pure air in the receiver, expansion made by means of the pump, and a shower of fine rain produced. The rain drops so produced are allowed to fall on a small silver mirror, the surface of which is ruled into millimetre squares, and the drops that fall on the little squares are counted. From the number so obtained, the number of dust particles in the air tested is calculated.

A number of photographs, illustrative of the nitrate of soda industry, and of the nitrate country, were exhibited by the Hon. Ralph Abercromby. The sun-distilling apparatus, which is situated at Sierra Gorda, near Caracoles, consists of 1875 square feet of glass, something like a row of cucumber frames. A thin layer of salt water is led under the glass, when the heat of the sun vaporizes some of the water, which condenses as a sweat on the under surface of the glass top. The drops gradually coalesce, trickle down into the narrow groove on which the panes of glass rest, and are then led by pipes into a reservoir of fresh water. Rather more water distils by night than by day, owing to the better condensation when the outer air is cool. Although the apparatus is extremely inefficient, owing to the absence of a proper condenser, and the details are bad, from 150

to 175 litres of fresh water are distilled every day, which is sold at a profit for 1½*d.* a gallon. Twenty years ago a similar apparatus, with 50,000 square feet of glass, was erected at Carmen Alto on the same desert, and worked very profitably, as 10*s.* a gallon could then be obtained for fresh water. This apparatus was afterwards wrecked by a whirlwind, and is now replaced by a steam condenser. In connection with a photograph of the precipitating tanks at the Primativa Company it is stated that the "caliche" or raw nitrate of soda is first crushed, then washed with hot water to extract the nitrate from the surrounding salt and dirt; after which the hot saturated water is run into shallow square tanks, where nearly pure nitrate of soda is precipitated.

A number of beautiful photographs of Ceylon vegetation, taken in the Peradeniya Gardens, were exhibited by the Director of the Royal Gardens, Kew. Among these may be mentioned views of the coffee plant in flower, of *Ficus indica* and of *Artabotrys odoratissima*, R.Br., a plant developing enormous serpentine roots appearing above ground.

Another very interesting botanical display was exhibited by Mr. P. E. Newberry, by permission of the Director of the Royal Gardens, Kew. It consisted of a series of ancient funeral wreaths and plant remains, discovered last year by Mr. W. M. Flinders Petrie, in the cemetery of Hawara, Egypt. The wreaths, which are of Egyptian and Greek manufacture, were all made in the first century B.C., and were found in wooden coffins, either resting on the heads or surrounding the bodies of the mummies. Among them the following are of special interest:—(1) A very perfect wreath composed of the flowerheads of a species of Immortelle (*Gnaphalium luteo-album*, L.), called by the ancients "helichrysos," and much used by them in making garlands. Helichrysos wreaths are mentioned by Pliny (*Hist. Nat.*, xxi., 96) as having been used in Egypt in Ptolemaic times; also by Theophrastus, Athenæus, Cratinus, etc. (2) Portion of a curious garland made of cones of papyrus pith, lychnis and rose flowers, rose petals and scarlet berries of the woody nightshade. These latter are mentioned by Pliny as having been employed in garland making by the Egyptians. (3) Portion of a wreath (of Greek manufacture) made of flowers of the polyanthus narcissus (*N. Tazetta*, L.). Wreaths made of this flower, the "clustered narcissus" of the ancients, are often mentioned by early Greek poets. (4) Portion of a wreath made of the flowers of a species of rose (*Rosa sancta*, Richards). (5) A perfect wreath composed of rose petals threaded by a needle on to strips of twine. "Recently," writes Pliny in his History of Garlands, "the rose chaplet has been adopted, and luxury has now arisen to such a pitch that rose garlands are held in no esteem at all if they do not consist entirely of petals sewn together with the needle" ('Hist. Nat.,' Bk. xxi., 8.) There are also exhibited (6) a portion of a wreath composed of twigs of sweet marjoram (*Origanum Majorana*, L.), lychnis flowers, coils of papyrus pith, and pieces of copper tinsil; (7) a portion of a wreath composed of chrysanthemum flowers and leaves, purple cornflowers, and petals of the flower of a species of *Hibiscus*; (8) a portion of a wreath made of flowers of *Matthiola Librator*, L., flowers of the polyanthus narcissus and *Hibiscus* petals; (9) portions of two necklaces made of flowers of the date palm threaded on strips of twine; and (10) a fragment of a necklace made of fruits of the date palm. Among the plant remains were found peach stones, dates and date stones, walnut shells, currants, pomegranates, plums, figs, chick peas, common garden beans and peas, lentils, wheat, barley and oats. These were probably the remains of the ancient funeral feasts which were held in the Hawara cemetery by the relatives of the deceased people who were buried there.

ROYAL INSTITUTION.

Quartz Fibres.

On Friday, the 14th inst., a lecture on Quartz Fibres was delivered by Mr. C. V. Boys. Speaking of the extremely minute forces which the physicist requires to measure, forces which are often so small that they bear the same proportion to the weight of a grain which the latter does to a ton, the lecturer showed that these forces could best be measured by the torsion produced in a wire or thread. The thread or wire used must evidently, in order to be of any use, possess certain properties, viz., tenacity and elasticity, and must be as fine as possible, for its sensitiveness increases very rapidly as it becomes finer, the torsion being inversely as the fourth power of the diameter; thus, if the diameter be one-half, the sensitiveness will be 16 times as great, or if the diameter be one-tenth the sensitiveness will be increased ten thousand times. One of the most promising materials for torsion fibres up to recent times was found in spun glass, which gave beautifully fine uniform threads about a thousandth of an inch in diameter, and of considerable strength; their only drawback was imperfect elasticity, the glass not entirely recovering its original position after torsion until after the lapse of weeks or months. For this reason spun glass was quite unsuitable for torsion threads, and fibres of unspun silk were generally preferred; these were fairly strong, being capable of supporting a weight of 60 grains, but were liable to variation from atmospheric influences. In searching for better materials for use in delicate apparatus, the lecturer had found that fused quartz might be drawn out into fibres which are all that could be desired, their elasticity and uniformity being perfect, whilst they are also extremely tough. The method of producing the fibres was shown, and consisted in attaching a piece of prepared quartz to an arrow which could be shot from a small cross-bow; the quartz was then softened in the oxy-hydrogen flame and the arrow discharged, drawing out a very thin fibre which could be found at the point of attachment to the arrow, and followed up to its other end. By suitably arranging the conditions the fibres could be obtained of any required degree of fineness, which could be ascertained by holding them up to a bright light and examining them with a prism. Photographs of these fibres were projected on a screen and these showed their great superiority over silk, glass, and platinum, the quartz fibre being perfectly uniform and so fine in many cases as to be scarcely visible; in fact the ends of some very finely spun fibres are so small as to be invisible even with the aid of the microscope, probably being only one-millionth of an inch in diameter. The uniformity and smoothness of the quartz fibres was also amusingly shown by the inability of spiders to ascend them, the animals slipping back directly they attempted to climb. The web of the garden spider was also utilized to illustrate another point. In drawing the fibres the oxy-hydrogen flame is used, because at that temperature the quartz is sufficiently fused to draw out, but it is still very viscous; if the electric arc be used the quartz is more liquid, and has the tendency of a liquid cylinder to break up into small spheres. The transverse threads of the spider's web were shown to resemble a string of beads, large and small beads alternating with each other; this was exactly imitated by stroking a quartz fibre with castor oil, which gave an identical appearance, and moreover caught flies as well as the natural web. A very striking illustration of the sensitiveness of the threads to torsion was given by performing the Cavendish experiment for measuring the mass of the earth, which has hitherto only been accomplished by the use of extremely large and cumbersome apparatus, with a very small portable instrument. In fact the lecturer was able with a very fine quartz fibre to show

the attraction of gravitation between two No. 5 shots, or detect a force equivalent to one 20,000,000,000th part of a grain. Experiments were also performed showing that quartz is a perfect non-conductor of electricity, even when wet, thus having a great superiority over glass in that respect.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of this Association was held at 103, Great Russell Street, on Thursday, April 4, Mr. T. A. Ellwood, Vice-President, in the chair.

The minutes of the previous meeting having been read and confirmed, the Vice-President called on Mr. F. Browne to read his paper on "Thermometers," which will be found at pp. 1010 and 1030 of this and the last numbers of the Journal.

At the conclusion of the paper,

The Vice-President said the members were much indebted to Mr. Browne for his paper, which showed a good deal of careful work. He should like to ask Mr. Browne whether he did not think it would be better to employ a gas of definite composition instead of air in the construction of vapour thermometers? It would no doubt be a great advantage if some more satisfactory material than glass could be used in the manufacture of thermometers, whose expansion was more exact. The immense amount of work necessary for the perfect graduation of thermometers no doubt accounted for the high price of good instruments, notwithstanding that thermometers were to be had at $4\frac{1}{2}d$.

Mr. T. S. Dymond said that he did not think quite sufficient prominence had been given the volatilization of mercury in thermometers; he had noticed, even at low temperatures, that considerable volatilization occasionally took place. It was worthy of notice that the thermometers examined by Mr. Browne, although of good make, were still 2° or even 3° out, a serious consideration in some cases.

Mr. Williams said that he did not think a simple gas would be of more service than air in vapour thermometers, as the expansion of all gases was similar. He believed though that nitrogen had been employed. There was much work to be done, he considered, in finding the most suitable mixture of glasses for thermometers, as also for optical purposes. He had found volatilization of mercury to take place at 130°, and mercurial thermometers were not perhaps quite reliable above 150°.

Mr. Salter asked whether the annealing process mentioned in the paper would not twist the bulb?

Mr. F. A. Rogers asked what glass was considered to be the best for making thermometers, and whether the thinness of the glass in the bulb of clinical thermometers did not raise the zero by contraction?

Mr. Browne, in reply to the question of the Chairman, said that air was used generally for gas thermometers: its expansion had been determined by many physicists, and found to be exactly $\frac{1}{273}$ of its volume for every degree raised in temperature; while in other gases, the expansion, although very nearly expressed by this number, was not exactly so. This fact only would not discourage the use of others, but as air was always ready at hand, so easily purified, and the conditions attending its use so well known, there was not much occasion to substitute another, except sometimes under certain conditions. It must not, however, be forgotten that an air thermometer is not always of the form that is usually seen. Regnault's, with which he determined the coefficient of expansion of air, was merely a hard glass bulb furnished with a capillary point, and filled with dry air. When heated, the air expanded, the capillary point was then closed, then broken off under mercury. Having obtained the weight of the bulb before being heated, then containing the mercury which had entered when the end was broken off, and again when full of this liquid, the volume of displaced air could be ascertained, and from this the temperature. With regard to Mr. Dymond's remark concerning the volatilization of the mercury, this would give rise to a considerable error if the thermometer were heated to a high temperature and maintained there for several hours. The amount would no doubt be more if no air were in the tube, which was never the case; however carefully the tube was filled, a minute bubble of air could be seen in the best instruments. With regard to Mr. Williams's inquiry concerning the use of nitrogen for gas thermometers, it was sometimes employed. Also the best glass to use was the hardest that could be obtained, as when such was not the case, the bulb was more affected by atmospheric pressure. There was no fear of the bulb bursting, as Mr. Salter suggested. The annealing process was employed generally when the thermometer had the very large upper bulb unremoved, and this allowed for the expansion of the mercury; most thermometers, in their finished state, had a small bulb at their upper ends, so that a fracture from this cause seldom occurred. When making a thermometer it said in the paper that a piece of hard glass tubing should be taken; and with reference to Mr. Rogers's inquiries as to the kind of hard glass, the hardest was always preferable. Clinical thermometers would not be graduated until the bulb had contracted to its maximum extent.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting was held on Thursday, June 6, Mr. F. Browne, Vice-President, in the chair.

Mr. G. S. Fuller read a paper on "Telephones," giving details of their construction, and illustrated by drawings and by the actual instruments. It was followed by a discussion in which the Chairman, Secretary, Messrs. Latchmore, Ough, Burridge, Thornley and Francis took part.

A paper on "Spectrum Analysis" was next read by Mr. A. Latchmore, who began with a historical sketch of the development of the spectroscope, noticing the work and discoveries of Kepler, Newton, Melville, Wollaston, Fraunhöfer, Herschell, Fox-Talbot, Brewster and Gladstone, Swan, Angstrom, and Kirchoff and Bunsen. The varieties of spectra, viz., continuous, bright line, line absorption, and the absorption spectra of coloured bodies, were then described in turn, and illustrated by projection on a screen. The characteristic line spectra of a large number of metals were shown, and the absorption spectra of hæmoglobin, chlorophyll, etc. The paper concluded with an account of the uses of the spectroscope in celestial observations, and the discoveries made by its means concerning the composition of the heavenly bodies.

After a discussion on Mr. Latchmore's paper the Chairman exhibited the peculiar alcoholic ferment known as the ginger-beer plant, and an animated debate on the physiological action of alcohol took place.

The meeting then adjourned.

Provincial Transactions.

ROYAL SOCIETY OF EDINBURGH.

At the evening meeting on June 17, Professor Dittmar communicated an interesting and important paper on the "Behaviour of the Hydrates and Carbonates of the Alkali Metals, and of Barium, at High Temperatures; on the Properties of Lithia, and the Atomic Weight of Lithium."

It is known generally that when carbonate of soda is heated in a crucible it loses weight at higher temperatures, and at lower temperatures recovers its original weight. Dr. Dittmar has observed, however, that

when carbonate of soda, or of potassium, is heated in a crucible into which a stream of hydrogen or nitrogen is conducted, the carbonate is reduced for the most part to hydrate. In all cases a certain percentage of carbonate remained, and on account of the volatility of potassium and sodium hydrates, and the persistent tendency of the fused hydrates to creep, an accurate estimation of the yield of hydrate from carbonate could not be made. When the fused carbonate is allowed to cool in an atmosphere of carbonic anhydride, perfectly pure normal carbonate is obtained. From an analysis of this pure carbonate, partly by titrating with a very dilute standard acid, the atomic weight 23·04 was found, which number is exactly that found by Stas.

Barium hydrate is usually supposed to be unaltered at a red heat, yet it is really to some extent decomposed, and when strongly heated in an atmosphere of hydrogen is completely reduced to BaO. Satisfactory results could not be obtained with rubidia, because of the avidity with which it attacks platinum.

Lithia in many respects approximates more to baryta than to the alkalies. In its behaviour on heating this is very manifest, as its carbonate is reduced with comparative ease to oxide. A few grams of the carbonate could be completely reduced to the oxide in forty-eight hours by heating in an atmosphere of hydrogen. The pure carbonate was prepared by allowing the oxide to cool in an atmosphere of carbonic anhydride. The pure salt so prepared was analysed by determining the CO_2, which was weighed with every precaution to ensure accuracy. On the assumption that $CO_2 = 44$, the atomic weight found for Li was 6·89, which is distinctly less than the number found by Stas, viz., 7. The salt was prepared with carbonic anhydride under varying pressures, but always with the same result on analysis.

Dr. Dittmar described the elaborate arrangements made by Stas to avoid error in his determination, but feared these were such as probably to lead to a certain amount of absorption of moisture. This might account for the difference in their results. The Professor is now engaged on a further investigation of the subject, working with the same salts as Stas.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The third botanical excursion of the season took place on Wednesday, June 12, to Arthur's Seat and Duddingston Loch. The company assembled at Holyrood at 6 a.m., and proceeded by St. Margaret's Well and St. Anthony's Chapel to the Crow Hill, and thence by Dunsapie Loch and the Delf Well to Duddingston Village and the south side of Duddingston Loch. The return journey was by Duddingston Road, passing the Sclyvers, Sampson's Ribs, and the Echoing Rock, and reaching town again about 9 o'clock. Among the many specimens collected, the following were in good condition:—*Caltha palustris*, *Cardamine pratensis*, *Equisetum palustre*, *Hippuris vulgaris*, *Iris pseudacorus*, *Lathyrus macrorrhizus*, *Lemna minor*, *L. trisulca*, *Lychnis Viscaria*, *Menyanthes trifoliata*, *Myosotis palustris*, *Nasturtium officinale*, *Oxytropis Uralensis*, *Polygonum Hydropiper*, *Ranunculus acris*, *R. bulbosus*, *R. Flammula*, *R. repens*, *R. sceleratus*, *Scirpus palustris*, *Veronica Beccabunga and V. Chamædrys*. The richest part of the ground gone over was the marshy ground to the south of Duddingston Loch. The specimen of the rare plant *Lychnis Viscaria* was got with difficulty from an almost inaccessible spot on Sampson's Ribs. The weather was fine and bright, and altogether the ramble was one of the most interesting and enjoyable that the Association has yet had. The next excursion is to Blackford Hill on the evening of Wednesday, June 26, starting from Blackford Hill Station at 9 p.m.

BRIGHTON ASSOCIATION OF PHARMACY.

The Annual Excursion of the Brighton Association of Pharmacy took place on Monday, the 17th inst., and was favoured with splendid weather. A party of about twenty assembled at the Brighton Railway Station and travelled to Ford Junction, from whence they proceeded to the river's side and embarked on Alderman Cox's yacht "Sissie" and proceeded on a trip down the river as far as Littlehampton. Returning up the river to Arundel they partook in the Duke of Norfolk's park of a luncheon provided by Alderman Cox. Lunch being ended the toast "Mr. Alderman Cox" was proposed by Mr. W. D. Savage, seconded by Dr. Newsholme, and suitably acknowledged by Mr. Cox, after which Mr. Jago proposed the toast of the "Brighton Association of Pharmacy," coupling with it the names of Mr. W. D. Savage and Mr. Marshall Leigh, to which both these gentlemen responded. Other toasts followed, and after a visit to the Bridge Hotel, where Mrs. Cox dispensed tea and other refreshments, and a ramble in the neighbourhood of the Park and Swanbourne Lake, the party returned to Brighton.

Obituary.

Notice has been received of the death of the following:—

On the 24th of May, Mr. George Brookes, Chemist and Druggist, Mostyn Street, Llandudno. Aged 41 years. Mr. Brookes had been a member of the Pharmaceutical Society since 1884.

On the 31st of May, Mr. William Pluse, Chemist and Druggist, Hurworth Place, near Darlington. Aged 68 years.

On the 31st of May, Mr. Walter Dudley North, Chemist and Druggist, Upper Kennington Lane, London. Aged 62 years. Mr. North had been a Member of the Pharmaceutical Society since 1869.

On the 31st of May, Mr. Philip Pickles, Chemist and Druggist, Shelf, near Halifax. Aged 61 years.

On the 1st of June, Mr. M. B. Field, Chemist and Druggist, Whitmore Reans, Wolverhampton. Aged 64 years.

On the 3rd of June, Mr. Lloyd William Hughes, Chemist and Druggist, Ruthin. Aged 56 years. Mr. Hughes had been a Member of the Pharmaceutical Society since 1886.

On the 7th of June, Mr. Henry Nichols, Chemist and Druggist, High Street, Petersfield. Aged 73 years.

On the 8th of June, Mr. Henry John Wigg, Chemist and Druggist. Aged 53 years. Mr. Wigg had at the time of his death been engaged for a period of thirty-four years in the house of Messrs. J. Bell and Co., Oxford Street.

At Inverness, on the 10th inst., after a short illness, Mr. George Galloway, junior partner in the firm of George Galloway and Son, Chemists. Mr. Galloway served his apprenticeship with his father, and afterwards continued his studies at Aberdeen. He became registered as a Pharmaceutical Chemist in 1873, and had for a number of years filled the post of Local Secretary with much acceptance.

BOOKS RECEIVED.

THE YORK CATALOGUE OF BRITISH MOSSES. Compiled by J. A. WHELDON, A.P.S. York. From the Author.

EXERCISES IN THE PREPARATION OF ORGANIC COMPOUNDS. By Professor EMIL FISCHER. Translated by ARCHIBALD KLING, F.I.C. With a Preface by W. DITTMAR, LL.D., etc. Glasgow: W. Hodge and Co. London: Williams and Norgate. 1889.

KEMP AND CO.'S PRESCRIBERS' PHARMACOPŒIA OF NEW DRUGS. Bombay: Kemp and Co. 1889. From the Publishers.

Correspondence.

The Railway Rates Question.

Sir,—I note that the railway companies state that they have no immediate intention of altering their rates as actually charged. This is very considerate of them. Nevertheless, I think it would be well for chemists to take the opportunity which the proposed revision offers for securing that the actual rates charged upon drugs shall be reduced to that charged to other trades upon exactly similar goods.

Having had occasion a few years since to inquire into the system of charging adopted by the G. E. Railway Company, I discovered that some goods which I frequently pay carriage upon could equally well be invoiced either as confectionery or as drugs, but that by invoicing them as confectionery I should save one-third of the carriage.

The only grounds upon which the company could charge this excessive rate upon drugs, are either that they are exceptionally bulky, or that the railway company incurs special risk in carrying them, but these explanations are not good enough. The packages of drugs as received in the present day by retail chemists are not specially bulky, rather the reverse, whilst even if we admit that the claims for damage made by druggists are heavier than those made by some traders, as these claims will upon inquiry not be found to amount to one per cent. on the freight charges, this small claim cannot fairly be made an excuse for an addition of 50 per cent to the carriage.

Now that the railway rates have come to the front, I would recommend chemists not to let the matter rest, until the railway companies put them upon a fair footing as compared with other trades.

It may be that the saving to individual chemists will be small; still, small items add up to quite large amounts, and, therefore, must not be neglected. Probably some trades which now compete with chemists in selling medicines obtain their medicines at the lower rates. The time has gone by when chemists can afford to give other businesses which compete with them even small advantages.

Colchester. J. C. Shenstone.

Suivez Raison.

Sir,—The readers of the *Pharmaceutical Journal* are kindly informed by Mr. Alfred Coleman that "education is a most desirable thing, but it is not the 'only' need of the pharmaceutical body." It is truly refreshing to find one at least who recognises the deficiencies of himself and brethren, and who is candid enough to admit them; for it must be painfully evident to all reasonable individuals that scientific education is by no means the only description of education these gentlemen stand in need of; common courtesy (than which nothing seems more uncommon among a certain class), gratitude and ordinary decency might all rank under their "needs."

Let Mr. Coleman well study these subjects, and then apply the education derived therefrom when speaking of gentlemen who have generously placed time, money and talents at the service of the Pharmaceutical Society.

A touching picture is drawn by Mr. Coleman of "chemists wearily waiting for the good time coming, when the medical fraternity will cease to do their own dispensing, etc." This "Pilgrim's Progress" phraseology is surely enough to make even the stony hearted Council weep tears of repentance; but myself having now sufficiently recovered from the shock which they naturally occasioned, I beg humbly to suggest that the proper time for "the medical fraternity to cease to do their own dispensing" will be just that precise time when chemists cease to prescribe.

What a mad fascination there seems to be in the word "coerce" for some folks! but until now I was always under the impression that "coerce" and "compel" were synonymous terms. Mr. Coleman, however, appears to think that by use of the double term an extra amount of righteous wrath will fall on the "medical fraternity;" poor "medical fraternity!"

In the beginning of his letter Mr. Alfred Coleman boasts of public opinion (*i.e.* members) moulding the Council, and in another part talks of the Council moulding public opinion. These two influences strike me as possessing something slightly antagonistic the one to the other, but then perhaps my "neediness" shows itself in my inability to follow this gentleman's reasoning. Says Mr. Coleman, "if every member of the Society, more especially the country members, would rouse themselves sufficiently to record their votes, a Council might easily be elected who would successfully labour to ameliorate some of these crying evils," etc. Might I presume to amend this by saying that if every chemist would give a cordial support to the Council and the Society, then the way would be rendered easier for dealing with these subjects.

Most cordially do I join with your correspondent in hoping to see more chemists joining the Pharmaceutical Society, and taking sufficient interest in the matter to vote at each election for the Council, and I believe that we should then see a greater appreciation of those services so self-denyingly rendered by the President and members of our Council.

52, *Harrow Road, W.* Albert H. Wilkerson.

Methyl-Orange and Other Indicators.

Sir,—A famous wit once remarked regarding a quarrel between two musicians of his day:—

"Strange that such difference should be
Twixt tweedle-dum and tweedle-dee."

Something similar might justly be said of the difference between benzol and benzene. In chemistry it is not as in cricket. There is no Marylebone Club to draw up the rules, and however much we may respect the Chemical Society, and the able Editor of its journal, none of us feels bound to follow the rules laid down for the guidance of the abstractors. Benzol is a perfectly correct expression, though benzene may be preferable. There are many more important questions in chemical nomenclature to be decided than benzene *versus* benzol, and the whole subject is one of great difficulty. Mr. Allen may say glycocine in preference to glycocol, but in so doing he is adopting the termination which many regard as the peculiar property of the alkaloids. Other examples could easily be given.

Messrs. Fischer and Phillip quite correctly describe methyl-orange as dimethylamidoazobenzolsulphonic acid. "Sulphate" was probably a slip made by myself in transcribing. The only difference between Messrs. Fischer and Phillip and Mr. Allen is that the former describe methyl-orange as the sulphonic acid, while Mr. Allen gives it as the ammonium or sodium salt of the acid.

Edinburgh. D. B. Dott.

The Sal Volatile Prosecution.—We are requested by Mr. P. T. White to state in reference to the question put to him by Mr. Forrest Fulton (see p. 1007), that his firm has been in existence since 1775.

Essence. — Goold in his 'Mineral Water Makers' Manual' gives a recipe for a soluble lemon tincture which consists in macerating the peel of six dozen sound lemons for three days in a gallon of spirit 16 over proof, with occasional agitation, then pouring the liquor off and letting it stand until bright. The lemons should be chosen with bright thick skins, as green as possible compatible with the fruit being well-developed, and the peel should be removed as free from the white as possible. Our correspondent also asks for a recipe for a "concentrated essence (fruit) of strawberry."

Inquirer.—There can be no doubt that the transaction would come within the range of the phrase "poisonous vegetable alkaloid" when a poisonous dose is dispensed.

A. P. B.—The coloration appears to be dependent on the presence of free acid in the spirit of nitrous ether and is due to its combination with the antipyrin to form a nitro compound that has been named "isonitrosoantipyrin." See *Pharm. Journal* for June 30, 1888, p. 1085.

Apprentice.—One third of a grain of yellow wax and one quarter of a grain of powdered liquorice to each pill. Perhaps in working with a gross more dry powder may be required.

R. Hawkes.—It is illegal for an unregistered person to sell by retail the preparation named.

Phullon.—Eriophorum polystachyon.

Communications, Letters, etc., have been received from Messrs. Vernon, Bardet, Wilkerson, Davis, Tyrer, Thompson, Inquirer, Anticoercion.

"THE MONTH."

Sodium Dithiosalicylate.

A few weeks since mention was made in these columns (April 27, p. 861) of a compound named dithiosalicylic acid, having the composition of two molecules of salicylic acid linked by two atoms of sulphur, which had been suggested as a possible advantageous substitute in some cases for salicylic acid. Two forms of sodium salt of this compound, described as No. I. and II., have been prepared, and the latter has been tested therapeutically in a few cases of articular rheumatism and in a case of gonitis gonorrhoica by Dr. Lindenborn in the city hospital at Frankfort (*Apot.-Zeit.*, June 26, p. 679). In light cases 0·2 gram was given morning and evening; in the more severe cases 0·2 gram was given in the morning, and in the evening the same quantity, two, three or four times every hour. In the lighter cases of rheumatism the pain and fever were overcome in two days and in the more severe in six days at the most and the swelling of the joints had disappeared. In these cases the medicine acted promptly upon the temperature, but when administered to some phthisical patients it showed no antipyretic action. The compound was also ascertained to have a powerful antiseptic action. As compared with sodium salicylate, Dr. Lindenborn considers sodium dithiosalicylate, No. II., presents the advantage of more powerful action in smaller doses and the absence of objectionable consequent symptoms. It occurs as a gray white powder, very hygroscopic and easily soluble without residue in water, the solution giving with ferric chloride a faint purple colour. From an acid solution of the salt the acid separates in yellow resinous drops that are nearly insoluble in water.

Hydracetin.

It will be remembered that a few months ago (*Pharm. Journ.*, Dec. 1, p. 425) under the name "pyrodin" a new preparation was introduced as an antipyretic, experience with which called forth repeated cautions as to its toxic action. The preparation was represented as having for its active principal acetylphenylhydrazin ($C_6H_5,NH-NH\cdot C_2H_3O_2$), but according to one statement it only represented one-fourth of the activity of that compound. More recently the pure acetylphenylhydrazin has been introduced in Germany under the name "hydracetin," and has been reported upon somewhat favourably by Dr. Guttmann (*Pharm. Centralh.*, May 16, p. 311; May 30, p. 341). According to Dr. Guttmann, hydracetin exercises a powerfully antipyretic action in relatively small doses and is also effective in relieving rheumatism of the joints. The doses given ranged from 5 to 20 centigrams in the day and in only a few cases to 30 centigrams; the dose recommended is 10 centigrams given in two doses of 5 centigrams daily. It is expressly stated however that its internal administration must be cautiously conducted, and must not be continuous. Hydracetin occurs as a white odourless and almost tasteless crystalline powder soluble in 50 parts of water and freely in alcohol. It reduces alkaline cupric solution immediately in the cold and precipitates metallic silver from an alkaline silver solution. Mercuric salts are converted by it into mercurous salts, quite rapidly upon warming, and ferric salts into ferrous. In a mixture of solution of potassium ferricyanide and dilute solution of ferric chloride the addition of hydracetin produces an immediate precipitation of Berlin blue; it also decolorizes solution of potassium permanganate and reduces platinic chloride to metallic platinum. Its powerful reducing action is considered by Dr. Guttmann to stand in relation to its antipyretic and anodyne properties, and he states that he has also used it with success as an outward application in psoriasis, in the form of a 10 per cent. ointment.

Santoninoxim.

According to M. Coppola the symptoms of poisoning sometimes following the administration of santonin are due to an intestinal catarrh produced by the worm, in which there is an exaggerated formation of lactic acid that favours the solution and consequent absorption of the santonin. He recommends therefore the substitution of santoninoxim, a crystalline substance that is less absorbable and non-toxic, and which he has found to be equally active when administered in double or triple doses (*Répertoire*, June 10, p. 257). The santoninoxim here mentioned is a compound obtained by Professor Cannizaro in 1885 (*Berichte*, xviii., 2746) through the action of hydroxylamine upon santonin in an alkaline liquid. The reaction is represented by the equation—

$$\underset{\text{Santonin.}}{C_{15}H_{18}O_3} + \underset{\text{Hydroxylamine.}}{NH_2OH} = H_2O + \underset{\text{Santoninoxim.}}{C_{15}H_{18}O_2\cdot NOH}.$$

Naphthol.

Some useful hints as to the dispensing of naphthol are given by M. Carles (*Répertoire*, June 10, p. 242). A concentrated solution, for topical application or use as a mother-liquor, can readily be prepared with alcohol, which dissolves naphthol in considerable quantity. When required for a gargle this mother-liquor may be mixed with honey simply liquefied by heat, the product remaining limpid for two or three days if the honey be free from water. To prepare dilute solutions is a more difficult problem, since besides alcohol only alkalies and alkaline salts act as solvents in proportion to their alkalinity; the products, however, are alkaline compounds of naphthol, which as in the case of the carbolates and salicylates are much weaker antiseptics than the free naphthol. Sodium benzoate, usually a good solvent, is in this case, useless. The method suggested is to dilute the alcoholic solution with an aqueous solution of soap, this alkaline and viscous liquid at the same time augmenting the solubility of the naphthol and facilitating its suspension in the menstruum. Another plan is to make the strong solution with camphorated spirit instead of pure alcohol, since camphor which possesses the property of liquefying dry naphthol retains this property in solution and at least renders the naphthol more miscible with water.

Thiocamf.

Under the name "thiocamf" Dr. Emerson Reynolds has published an extremely laudatory notice of a new disinfectant, the basis of which is said to be a liquid that is formed when sulphur dioxide is brought into contact with camphor (*Chem. News*, June 22, p. 291). It appears that although sulphurous acid gas alone requires a pressure of at least two atmospheres for its liquefaction, contact with camphor effects the liquefaction at once without any pressure. Some little mystery is preserved about other bactericides that are introduced, but as the preparation is to become the subject of a patent this is perhaps explicable. The principal feature, however, seems to be that whereas the liquid can be kept in bottles

without pressure at an average temperature, the mere exposure of it in a thin layer to the air determines the steady evolution of relatively enormous volumes of sulphurous acid gas.

Morphine Vaseline.

In the last number of the *Asclepiad* (p. 147), Dr. Richardson states that morphine combined with vaseline forms one of the best sedative applications in cases of external malignant disease in which there is ulcerative breach of surface with continuous pain. The formula recommended is :—"Vaseline, pure, ℥j; Chloroform, ℥ij; Morphine, gr. iv. Mix thoroughly and make into an ointment." The object of using the chloroform is to allow of the incorporation of a larger quantity of the alkaloid and to secure its uniform distribution through the mass. The ointment is most conveniently applied thinly spread over a piece of fine lint or soft linen, and the dressing may be renewed twice in twenty-four hours.

Physiological Action of Pilocarpine.

The nature of the physiological action of pilocarpine has been a subject of disagreement among pharmacologists, some classing it in this respect with the nicotine group and some with the muscarine group. In order to determine this point Dr. Coppola has experimented as to the action of three pilocarpine derivatives that no longer contained pentavalent nitrogen, and in which, consequently, this relationship in chemical constitution with muscarine had been destroyed (*Chem. Zeit., Rep.*, June 8, p. 173). The compounds chosen were carbo-β-pyridinic acid, pilocarpidine and jaborine. All three derivatives manifested an action similar to that of pilocarpine, and it is inferred therefore that the physiological action of that alkaloid depends essentially upon the pyridine group. The trimethylamine group does not act like muscarine, but is described as "intensifying only the non-pyridinic part of the molecule." The conclusion consequently arrived at is that pilocarpine belongs pharmacologically to the nicotine group.

Barium Chloride.

Dr. Hare, of Philadelphia, following up in practice the indications given by Dr. Lauder Brunton and others, of the property of small doses of barium chloride to slow the action of the heart, steady its rhythm and increase the volume of blood thrown out of the ventricle, has used it with such success that it is now recommended as a cheap, virtually tasteless, and very slightly poisonous drug, which acts as rapidly as does digitalis, and does not disorder the stomach. In many works on chemistry barium is stated to be an irritant poison, but Dr. Hare states that to produce such an effect the dose given must be extremely large, and many times greater than any amount useful for practical medicinal purposes (*Practitioner*, June, p. 440).

Lactose as a Diuretic.

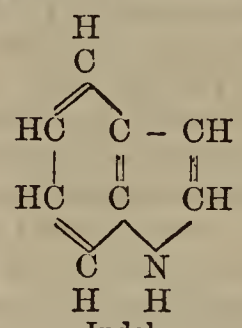
In a recent communication to the French Academy of Medicine M. Germain Sée called attention to the powerful diuretic properties of lactose (*Med. Pr. Circ.*, June 26, p. 669). It is to this constituent that he attributes the diuretic action of milk, which, however, is apt to produce inconvenience when administered for a long time.

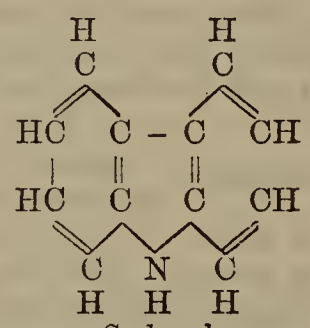
Mussel Poisoning.

The occasional occurrence of poisoning through the eating of mussels forms the subject of an official report by the Consultative Committee for Sea Fisheries in France (*Nature*, June 20, p. 178). Various explanations as to the cause of the occasional toxic action were investigated by the Committee, among them the suggestion that it is due to a parasite crab (*Pinnotheres pisum*); but this was dismissed, as the same crab is said to be sought after in the United States as an article of food. Other suggestions that it is due to the spawn of star-fish, or to copper absorbed from the water, as well as the radical one that the symptoms observed have been simply the work of the imagination, were considered to be disproved. The Committee came to the conclusion that the poisonous action of mussels is due to the presence, especially in the liver of the fish, of an organic base, the mytilotoxine of Brieger, and that this is developed under the influence of a particular microbe occurring only in mussels that have lived in stagnant or polluted water. It is stated that such mussels are deprived of their poisonous property by the addition of sodium carbonate to the water in which they are boiled.

Constitution of Strychnine.

In heating strychnine with excess of soda-lime Messrs. Loebisch and Malfatti have observed that at a temperature a little above the fusing-point of the alkaloid (290° C.) carbazol is split off. They also obtained skatol and β-methylpyridin, which had previously been found by Stöhr among the products of the dry distillation of strychnine hydrochloride (*Pharm. Centralh.*, May 30, p. 337). In respect to the connection between carbazol and skatol (methylindol), and accepting the view of Bayer and Emmerling as to indol being benzol-pyrrol, Messrs. Loebisch and Malfatti suggest that carbazol is dibenzol-pyrrol.


Indol.


Carbazol.

Alkaloids of the Potato Plant.

In a communication presented to the Vienna Academy of Sciences (*Chem. Zeit.*, June 15, p. 781) Herr Firbar reports that he has separated from shoots of the *Solanum tuberosum* two bases, of which one is crystalline and identical with that hitherto known as solanine, while the other, which is amorphous and has hitherto been considered chemically identical with solanine, he has found to differ from it in composition and properties. According to his analyses the composition of solanine is represented by the formula $C_{52}H_{93}NO_{18}$, while that of the amorphous base, which he has named "solaneine," is represented by $C_{52}H_{83}NO_{13}$. Both of these bases when boiled with dilute acid yield solanidine ($C_{40}H_{61}NO_2$) and sugar, but in different proportions. The sugar apparently differs from dextrose or levulose.

Tanghinin.

Under the name "tanguin" a substance was formerly used as an ordeal poison in Madagascar, concerning which little information has been obtained beyond the fact that it was derived from the seed of *Tanghina venenifera*, an apocynaceous plant. Like other judicial tests of the kind the drug appears to have been variable in its action : sometimes it quickly

produced emesis and nothing worse befel the person on trial, who was therefore considered innocent; at other times it was retained in the stomach and quickly proved fatal, when the victim would of course be held to have been guilty. In exhausting with boiling alcohol the crushed seeds, previously treated with carbon bisulphide, and evaporating the tincture, M. Arnaud has recently obtained a crystalline substance that acts powerfully as a poison (*Compt. Rend.*, cviii., 1255). The compound, which has been named "tanghinin," is a cardiac poison approximating in its action to strophanthin and oubain, but differing in producing a general convulsive action. It is colourless, crystallizes in perfect rhombs, is very slightly soluble in water, more soluble in ether, and freely soluble in strong alcohol. It contains no nitrogen, and although it is decomposed by acids no reducing sugar is separated.

Gum from the Silver Wattle.

The difficulty that has for some time past existed in regard to the supply of gum arabic lends additional interest to a communication sent by M. Naudin from Antibes (*Répertoire*, June 10, p. 244). He states that for some years past he has had in his experimental garden, at Collioure, a specimen of *Acacia dealbata*, the "silver wattle" of Australia, which without any known cause has commenced to produce gum in such quantity that the tree is enveloped in it from the root to the branches, whilst around the base of the trunk the gum has accumulated and mixing with the earth has formed a large cake. Some of this gum, which is described as being very fine and transparent, has been submitted to M. Cloez, the well-known chemist, who pronounces it to be identical with gum arabic. M. Naudin recalls the fact that the phenomenon of "gumming" in trees of certain species has been attributed by Dr. Beijerinck to the action of a ferment produced by a fungus (*Pharm. Journ.*, [3], xiv., 661; see also xvi., 285), which can be conveyed by inoculation to a sound tree, and he suggests that as the Australian acacias could probably be grown successfully in Algeria some systematic experiments should be made in this direction.

Chicle Gum.

Chicle gum is said to be exported annually to the extent of several million pounds from Tuxpan, on the peninsula of Yucatan, to the United States. The chewing gum is made by melting the chicle, and while it is still hot incorporating with it as much sugar and flavouring as will make the mass brittle upon cooling. The mass is rolled out whilst hot and cut into squares with a confectioner's rolling knife. The pieces after being separated are sprinkled with powdered sugar to prevent them sticking together. Paraffin is said to be sometimes used for the same purpose (*Western Druggist*, June, p. 176).

Capsicum and Bird's Plumage.

It is known that a practice obtains among bird-fanciers of giving cayenne pepper to canaries to brighten their plumage, and some years ago Mr. Greenish stated that a non-pungent product of a highly coloured capsicum was used for this purpose (*Pharm. Journ.* [3], xi., 344). The results of an investigation submitted to the Physiological Society of Berlin by Dr. Sauermann show that the practice is well founded, though the feeding with pepper only produces the desired effect when given to young birds before they moult, the colour of the feathers of older birds not being affected by it (*Nature*, June 20, p. 192). The development of a ruddy hue is favoured by moisture, and the colour again disappears under the influence of sunlight and cold. It was found that the pungent principle takes no part in this change, which is brought about by the colouring matter held in solution by triolein, which is present in the fruit in abundance. The dried pigment is inactive, but a solution in glycerine acts like the oleine solution, and the same remark applies to the feeding of birds with aniline colours. Not only is the pigment stored up in the feathers, but it occurs also in the egg-yolk. Four days after commencing to feed a bird with the pigment dissolved in fat a coloured ring was observed in an egg-yolk, and after two more days' feeding the whole yolk was coloured. The experiments were carried out upon canaries, fowls, pigeons and other birds.

Capsaicin.

According to Dr. A. Meyer, capsaicin, the pungent principle of the capsicum, occurs only in the pale yellow-red thin placenta that covers the inner side of the fruit (*Pharm. Zeit.*, Feb. 23, p. 130). Adopting a process corresponding to that of Thresh for the separation of capsaicin he obtained from the placenta a quantity equal to 0·9 per cent., whilst the fruit itself only yielded 0·02 per cent.

Red Pepper.

The cultivation of the red pepper plant is said to be increasing considerably in Turkey and to now form an important branch of industry. It is chiefly carried on in the cantons of Karadja Abad, in the districts of Vardar Yenidje and of Védine, a vilayet of Salonica. There are two gatherings, the first being the best quality, as the pepper reddens imperfectly in the autumn. The last harvest in the canton of Yenidje Karadja Abad amounted to about 350,000 okes (oke = 2·84 lbs.), and in that of Vediné Karadja Abad to about the same quantity. About 45 per cent. is exported to Europe, 30 per cent. to the neighbouring countries Bulgaria, Servia and Austria-Hungary, and the remainder to different parts of the Turkish empire (*Journ. Soc. Arts*, p. 605).

Gnomium.

In a communication to the *Chemiker Zeitung* (June 12, p. 757), Dr. Fleitmann, who states that he has been connected with the nickel industry during the last thirty-eight years, expresses strongly his doubt as to the existence of any such element as that which Messrs. Krüss and Schmidt recently reported that they had separated from impure nickel and cobalt and which they have since named "gnomium." He states that he has repeatedly and carefully tested most diverse samples of nickel as well as of cobalt oxide of commerce for the new metal according to the statements of Messrs. Krüss and Schmidt, and even when working with 50 grams of substance obtained no weighable quantity of a body confirmatory of the opinion that there was present a metal hitherto unknown. Admitting the unsatisfactoriness of putting negative results against positive observations he nevertheless infers from the results of his experiments that if there actually exists a metal hitherto unrecognized that is regularly associated with nickel and cobalt it must be present in extraordinarily small quantity. Dr. Fleitmann says that when nickel and cobalt of commerce, in the form of hydroxide, are treated according to the statements of Messrs. Krüss and Schmidt with large quantities of sodium

hydrate, varying quantities of impurities which occur in these oxides are dissolved together with small quantities of the lower oxides of nickel and cobalt. The impurities consist, according to the origin of the sample, of small quantities of lead and zinc oxides, arsenic acid, molybdic acid, silicic acid, alumina, cerium oxide, chromic acid, etc. The accompanying lower oxides of nickel and cobalt, which as a rule do not exceed one-twentieth per cent., when separated from the other impurities dissolved in the alkaline liquor are no longer soluble in sodium hydrate, showing the solubility to be dependent upon the presence of the impurities, especially the arsenic acid, silicic acid and alumina. If the alkaline extract of these impurities be treated with hydrochloric acid until the precipitate which at first forms is redissolved, and then with ammonium carbonate, a mixture of oxides and acids is obtained that may well perplex an inexperienced operator. Dr. Fleitmann thinks it not improbable that it was such a mixture that Messrs. Krüss and Schmidt had to do with, and that "gnomium" exists only in the imagination of the discoverers.

Mithridatism.

Professor E. Ray Lankester proposes to introduce the word "mithridatism" to indicate an immunity from the effects of poison induced by administering to an organism gradually increased doses of poison (*Nature*, June 13, p. 149). The corresponding verb and adjective would be "mithridatize" and "mithridatic." The choice of this word has been suggested by the tradition that Mithridates Eupator, King of Pontus, so far impregnated himself with poisons upon which he experimented, that finally when he wished to kill himself by poison he failed, having made himself "immune" or refractory to all known toxic agents.

Food of Bee Larvæ.

Notwithstanding the close and prolonged attention that has been paid to bee evolution, comparatively little is yet known as to the conditions under which apparently identical eggs and larvæ are developed at the will of the adult bees of a hive into either queen bees, drones or workers. It has been long understood that some difference exists between the food administered to larvæ intended to develope into queens and that given to those intended for drones or workers, although it was believed in each case to consist of a kind of chyle, formed from digested pollen and honey; but this knowledge has been recently somewhat extended by Dr. A. von Planta, whose papers on the subject, including one that has just appeared (*Zeit. phys. Chem.*, xiii., 553), may be briefly summarized as follows. Dr. von Planta has found by analysis that there exist essential differences in the composition not only of the food pastes administered to the queen, drone and worker larvæ, but also in that of those given to the drone and worker larvæ at different stages of their development. The results were obtained by dissolving out the food paste from a large number of cells, after removal of the larvæ, then evaporating and examining the dry residues. It was found that the food given in the case of the queen was fairly uniform in composition during the whole of the larval period, and contained, on the average, 45·14 per cent. of nitrogenous substance, 13·55 per cent. of fat, and 20·39 per cent. of glucose. In the case of the drone, however, there was a considerable variation. Up to the fourth day the food paste had a composition of 55·91 per cent. of nitrogenous substance, 11·9 per cent. of fat, and 9·57 per cent. of glucose; but after the fourth day the nitrogenous substance had fallen to 31·67 per cent. and the fat to 4·74 per cent., whilst the glucose had increased to 38·94 per cent.; the averages of these three constituents over the whole period being 43·79, 8·32 and 24·03 respectively. In like manner, in the case of the worker the proportion of nitrogenous substance in the food decreased from 53·38 per cent. in the first four days of larval life to 27·87 per cent. afterwards, and the fat from 8·38 to 3·69 per cent., whilst the glucose increased from 18·09 to 44·9 per cent., the averages during the whole larval period being 40·62, 6·03 and 31·51 per cent. It therefore appears that for the first four days both the drone and the worker larvæ receive a food that is even richer in nitrogenous matter than that given to queen larvæ, but that after that time the quality falls off very much. Another interesting fact, revealed by the microscope, was that whilst undigested pollen was never found in the food intended for queen or worker larvæ, it was present in considerable quantity in that supplied to the drone larvæ after the fourth day. The explanation offered is that the small size of the worker cell necessitates that the food stowed up in it shall be free from useless constituents. Further, the falling off in the nitrogenous quality of the food given to the worker larvæ is thought to explain the experience of bee-keepers that a queen developed from a larva not set aside for the purpose before it is four days old is usually wanting in vigour.

Liquidambar styraciflua.

Attention appears to have been directed of late years to *Liquidambar styraciflua* as a source of valuable timber (*Garden*, June 8, p. 520), and notwithstanding the difficulty of seasoning it and its tendency to warp and shrink, large quantities of the timber are said to be now manufactured into furniture. The valuable product, resembling liquid storax, derived from the bark of this tree and increasingly used in perfumery, is therefore in danger of becoming considerably higher in price in the course of a few years. Fortunately, the tree attains its greatest development in deep swamps which are incapable of being drained, and are inundated every year for several weeks, so that the extermination of the tree is not likely to take place.

Amorphophallus Titanum.

The gigantic aroid, *Amorphophallus Titanum*, has just flowered at Kew Gardens in the Victoria House. Two months ago the tuber of the plant weighed 57 lbs. The spadix has attained a height of about 6 feet. Possibly now that the attention of the scientific public is being directed to the most remarkable plant of the arum family, experiments on the chemical character of the nauseous odour exhaled by many species, and on that of the peculiar acrid principle found in others, may be undertaken. The *Gardeners' Chronicle* (June 15) gives an illustration of this gigantic arum, and devotes an editorial article to details concerning it. Another remarkable aroid, *Amorphallus campanulatus*, the spadix of which exhales a fetid odour, has lately flowered at Kew, and an illustration of it is given in the same journal.

In the *Journal of Botany* for June two interesting examples of teratological phenomena are re-

Teratology. corded. One of these came from Settle in Yorkshire, and consisted of pistillate flowers of the common hazel, occurring at the base of an undeveloped male catkin, the stigmas being large and of a brilliant colour. The other came from Plymouth, and consisted of an abnormal arrangement of the parts of the flower of the common ivy. In some blossoms the ovary was replaced by a fleshy cup, having on its inner surface a circle of nearly sessile anthers, and in others the floral axis was prolonged beyond the cup, carrying with it an ovary and a variable number of hypogynous stamens. The remarks elicited by this curious monstrosity from Dr. Masters are worthy of record. He says, "Terminology, when once it gets established, is apt to be conservative in its application, tyrannical in its sway, stagnant in the midst of change, and misleading to the unwary. Of course this stability has many advantages, but it seems to point to the desirability of making terms, as also names of plants, mere tokens, and not in themselves propositions or statements of facts. Nevertheless for the convenience of arrangement, these monstrous ivy flowers may be said to have presented examples of the misplacement of the stamens, dialysis and displacement of the carpels, staminody of the pistil, suppression of the placentas, ovules and styles, and of median floral prolification. Looked at historically they illustrate arrest of growth and development in some points, excess and superfluity in others; physiologically they represent almost the greatest degree of interchange possible; and genealogically they afford abundant evidence for speculation as to what may have been!" The article may well be entitled "An Erratic Ivy."

It may be useful to place on record the fact that the herbarium of the late Dr. J. T. Boswell, which

British Herbarium. contained the types of the plants described in the last edition of Sowerby's 'English Botany,' has been acquired by Mr. T. J. Hanbury. The bulk of the foreign herbarium belonging to the same authority has been purchased by Mr. J. Cosmo-Melvill, of Prestwich, Manchester (*Journ. Bot.*, p. 192).

FLORAL FEATURES OF THE AMAZON VALLEY.*

BY DR. H. H. RUSBY.

(*Concluded from page* 870.)

A totally different region claims our attention from this time onward. A vast level plain traversed by a network of sluggish streams, thickly grown with the most gigantic forest trees on the globe, and all bound together in one vast netting by a myriad of woody climbers, is a description which will generally characterize the new scene of our travels.

The forest region here referred to is not confined to Brazil. It may be considered as beginning in the north near the Carribean Sea, and extending southward over 25° of latitude, or more than 1,500 miles to the great plains of the Argentine, and extending from east to west to the base of the Andes, occupying large districts in Bolivia, Peru, and the countries to the northward. Some idea of the vastness of this region can be gained by considering the fact that when we have reached Para, at the mouth of the Amazon, we are only about half way from New York to Rio Janeiro. And yet, starting at the Amazon, we may sail for weeks upon its tributaries to the northward without having passed beyond the borders of this great forest region.

Its surface is for the most part very level. There are some true mountains to the northward, westward and along the south-western coast, and through the central portion run some scattered ridges of hills. But these elevations form mere points upon its great surface. The great bulk of the section forms one of the most level tracts in the world, unmarked by any elevations save a few billowy swells such as we find upon the most level of our western prairies. The water-sheds which separate its river sources are very different from those which exist elsewhere. In some old maps these water-shed regions are indicated by ranges of mountains. But no such ranges actually exist. There are some clayey or gravelly banks, and that is all. So slight are these elevations near the head of the Rio Negro that during high water canoes can sail from this Amazon stream directly upon the tributaries of streams flowing into the Carribean Sea. In the same way the savages can often pass from the southern borders of the Amazon region into the basins of the rivers farther south. I have often witnessed the curious phenomenon of water flowing with a strong current up the stream. This is because the fall is so slight and the difference in elevation so little between a stream and its tributary that any sudden rise in the larger stream will at once raise its level above that of its tributary, and thus reverse their relations.

With regard to its soil, it is for the most part a sandy or clayey loam. The original fine sand or clay has become modified by the enormous amounts of decaying vegetable matter that have accumulated during the centuries and produced the conditions that we now find. The soil is not nearly so rich in itself as is generally supposed. It is the favouring conditions of heat and moisture rather than a natural richness that determines the luxuriant vegetable growth. Rocky land is almost unknown. Even the higher lands about the water-sheds show but little rock, and this is *in situ*, there being no scattered boulders such as we see in most countries. So scarce are stones over most of the region, that many of the savage tribes regard them as worthy of worship, and consider the finding of them as an incident of as great interest as the finding of a precious gem would be amongst us. To this general rule I need not say there are numerous exceptions. The falls of the Maderia are produced by the presence of continuous ridges of hard rock, and in the southern section there are vast gravel beds in which diamonds are found.

It is generally conceded that no other extensive region in the world is so abundantly watered as is the Amazon valley. The explanation is very simple. During many months of the year the hot winds blow with great steadiness across the Atlantic, becoming charged as they go with moisture. Sweeping over this vast expanse they meet with very little in the way of elevation and sudden changes of temperature to precipitate their moisture, so that it may be considered that on their way from the Atlantic to the Andes they gain more than they lose. Reaching the mountains supercharged with humidity they are there forced into closest quarters, and the moisture, as Orton has happily expressed it, is "wrung out of them." At the same time they endeavour to escape upward, and thus come into the region of cold which completes the work of precipitation. Such clouds as soar above the region of rain are congealed and fall as snow, which melts and is returned by tens of thousands of water courses to the valleys below. So that even during the dryest seasons there is an abundance of water, and during the rainy seasons the supply is excessive indeed. Then every little rill upon the mountain side becomes a rivulet, the rivulets become rivers, and the rivers surging and rushing torrents which sweep away every

* Lecture delivered at the Massachusetts College of Pharmacy, March 6. From the *New England Druggist*, April.

obstacle, overflow their banks, and convert the intervening country into lakes or seas. The season of 1885 and 1886, when I traversed this region, was one of the most destructive ever known. Then all the tributaries of the Maderia near that stream were united, and the country for hundreds of miles in every direction was a vast inland sea, but for the fact that it exhibited a strong current setting in the direction of the Amazon, sweeping away the buildings, plantations and stock of the few settlers, destroying the wild animals, and laying low miles of heavy forest. When such a flood has passed, the country is left in a peculiar condition. Owing to the level nature of the country the water subsides but slowly and leaves all the lower places as pools of water, which must depend upon evaporation to become emptied. Into these pools are drawn vast deposits of loose vegetable matter, as well as the bodies of drowned animals. Enormous numbers of fishes are also stranded within the forest. All these organic matters now begin to putrefy in the torrid heat. The evaporated moisture loads the air so that at times one can scarcely distinguish objects clearly even at a little distance. What better conditions for the origin and propagation of deadly fevers can be imagined than are here presented. And a fever once contracted, all the conditions tend to carry it on to a fatal termination. The conditions that produced it continue to feed it, and vast swarms of insects soon make their appearance, which by their attacks, interminable by night or day, not only wear out the nervous system, but by their great numbers serve to poison the already contaminated blood.

In the Brazilian forests we constantly see the most beautiful illustrations of the compensatory character of nature's laws. It always seems that the same forces which produce an evil condition provide the means for modifying it to a greater or less extent. Nature is a great economist, and will not suffer waste, and so the dead vegetable matter is quickly seized upon and builded up into new forms. Even the dead animal matter is to a great extent consumed by innumerable alligators, and even by droves of wild hogs, which soon spread themselves again over the lately submerged country. Those masses which go on to putrefaction are utilized by the larvæ of untold millions of insects.

In the streams themselves we have a compensation for the obstruction to travel which exists in the impenetrable vegetation. But a poor idea of this vegetation can be gained by one who has not seen it. The forest trees themselves, without the addition of any undergrowth, would prove a great impediment, for they are so immense and stand so thickly upon the ground that a road between them would be impossible. Their trunks do not rise as simple columns from the ground. They are buttressed with great wedges of timber, which begin at six to fifteen feet above the ground and spread out for many feet from the trunk, interlocking with them those from the neighbouring trees. The immense thickness of these trunks masks their height so that we do not realise their immensity, especially after we have become a little accustomed to them, until some accidental comparison discloses it to us. Thus a settler may have hewn out a clearing in the edge of the forest leaving a single tree standing. When we compare this tree with the height of the building at its foot, when we contrast the thickness of some fallen branch with our forest trees at home, or when we find that our excellent gun will scarcely kill the birds among the lower branches, then we begin to realise the actual dimensions of these Brazilian giants. To establish a plantation in such a forest is a truly herculean task, and one which need not be undertaken without a goodly force of men, for as fast as the forest is cleared, say to the eastward, the dense undergrowth is springing up behind us from the westward. The cutting and keeping open of a road through such a forest is no less difficult. The trees themselves constitute but an item in the bill of difficulties. Not a tree but supports from five to fifteen species of gigantic vines. These vines, after all, rather than the giant trees, may be considered as the characteristic feature of Brazilian vegetation. They are of all sizes, from the slender wiry "mita-mora" to the gigantic begonia some two or three feet in diameter. They are of all forms, moreover. Some in the maple family seem to consist of three cylinders united into a triangular stem. Others are like ribbons, sometimes spirally twisted, sometimes convoluted and sometimes folded backward and forward upon themselves. Some are smooth and some are thorny, the thorns being either straight or hooked. The trees support the greater vines, the greater support the lesser, and these still lesser, until the whole forest becomes a knotted and tangled mass. The dead branch, however heavy, can seldom fall entirely to the ground, but depends from a network of vines, which but a little time since were its own dependents. This branch then becomes a hanging basket of the richest parasitic orchids, tillandsias, and ferns, and becomes a thing of beauty and a joy for ever. Up aloft we have a living canopy, unbroken except for the stream, and extending for thousands of miles and almost excluding the light of day. Beneath it all is twilight, and but little vegetation can exist except such as accidentally drops down from the roof above and struggles down for a precarious living. So continuous is this canopy of vegetation that the largest monkey or other climbing animal could with the utmost ease cross the continent without once descending to the ground, but for the rivers and lakes that occasionally would intercept him. Indeed, it has been pointed out that in the Brazilian forest the true world of life, both vegetable and animal, is far above the ground upon this surface of green, and that its inhabitants are for the most part unconscious of the existence of any other sphere but this. Now you can imagine the difficulties of making and keeping roads through such a wilderness as this, and you can form some estimate of the facility afforded by the numerous streams of Brazil. But for them the interior of this region would even now be almost unknown, for the wealthiest governments in the world would be unable to maintain an extensive exploration of the region by means of land travel. It is only by the possession of a goodly force of men to clear away that the traveller can average a few miles a day by land, and as I have stated, this way closes up behind him with marvellous rapidity. The rivers, on the other hand, afford the most perfect facilities for travel and transport. The level nature of the surface prevents the occurrence of any, or many, serious obstructions in the way of falls or rapids. And what is lost by the current in the ascent is gained in the descent when the most bulky or heavy freight is carried. By their means thousands of miles of almost uninterrupted travel can be secured in almost any direction, and these few obstacles once passed the course is open for hundreds of miles beyond. Of the size of these rivers no idea is conveyed by figures. Sailing upon the Amazon we look off to some land in the dim distance, and are informed that it is only an island in the wonderful stream. A foolish writer in *Harper's Monthly* has stated that more water flows through the Detroit river than through any other river in the world except the St. Lawrence, near its mouth. But the Amazon could receive the waters of several Detroits, and at a point more than a thousand miles above its mouth, and no one could see any greater result than the pouring of a bucket of water into the Connecticut. These characteristics of land and water travel, and the sparseness of the population, determine the character of the domestic trade of Brazil and the regions adjacent. Everything must

enter the mouths of two or three rivers and pass a few cities, chief of which is Paria. Hence the future greatness of that happy city. From these large steamers carry the merchandize up the Amazon and its chief affluents. Here it is transferred to smaller vessels and thence carried further inland. At length it is taken in hand by the floating traders, who distribute it to its destination in large row boats carrying from five to eight tons, and manned by ten to fourteen men armed with paddles instead of oars.

Some of the productions of this region are of great importance, and I am sure that a brief consideration of them will not be wearisome to you. Chief among them is indiarubber. The possession of a fine rubber estancia is like the possession of a goose which lays daily a golden egg.

The rubber forests are open to pre-emption by all comers, provided they do not trespass upon the domain of another. A man may take up as much land as he can work. His claim is established by cutting a pathway through the forest from one tree to another, and portioning out the care of the trees and the collection of the product among his men. Each district of forty trees constitutes an "estrado," and each man can manage from two to five "estrados" according to his industry and the proximity of the trees. Each man is furnished with a number of little tin cups, holding about a gill, and a small picking instrument for making incisions in the bark of the trees. He selects a spot upon the tree where the sap will trickle down as he desires and rapidly picks a few holes just through the bark in such a way that the sap will flow from one into another, and all in turn into the tin cup, which he dexterously inserts beneath some scale of bark or attaches by means of a little ball of mud, which he carries for this purpose. Twice a day he visits his trees and collects the sap into a large tin bucket, which is then carried to the smoking place and deposited in an immense copper cauldron. For the smoking fire certain substances are greatly preferred to others, probably because of some curdling ferment which the smoke contains. The most preferable is the fruit of the muticu palm. This is an abundant species in most sections, and exceedingly useful. Its leaves serve for thatching, its bark fibres for cordage, its tender heart portion for making an excellent salad, and from its nuts is expressed an oil which is valued as a substitute for butter, and which is said to have no rival as a dressing for the hair.

Next to these the smoker prizes the outer husk of the Brazil nut. In any case he inverts over the fire a large earthen bowl so as to exclude the air. A small opening is made for the exit of the dense smoke which results. The sap in its original condition exactly resembles milk, and indeed it is a true milk in its composition. Fatal accidents have resulted from this dangerous resemblance, for the milk taken into the stomach soon becomes converted into a mass of rubber. Into the cauldron he dips a small wooden paddle, shaped like a spoon, but with plain surfaces. In an instant he has the dripping utensil over the column of smoke, turning it skilfully and rapidly so as to prevent the running away of the precious fluid. As soon as it is firm enough to stay without running it is again dipped, and the process repeated until upon the paddle a ball of rubber of from fifteen to seventy-five pounds has been formed. This is then slit up and removed from the paddle. It afterwards loses much weight by drying, and if sold at once a large discount must accordingly be made. The daily yield of a tree is about 2 or 3 gills, and it is estimated that from 25 to 75 pounds of rubber per week should be obtained for each man employed. It is clearly, therefore, a question of men, and the rubber gatherers are willing to pay good prices to anyone who will bring these men to work upon their estancias. So sure a business is rubber gathering that almost any merchant of Para will loan money or advance goods to anyone who is going up the river to gather rubber, the amount being in regular proportion to the number of men that he is taking with him. I know of one man who boasts that his rubber station yields him a gross income of $500 daily. But he has two hundred men. Rubber gathering constitutes by far the most important industry of the Amazon valley. It is in fact several times greater than all the other industries combined.

An important industry during January and February is the collection of Brazil nuts. These nuts begin to fall as early as October, but the regular season is in the months named. The tree flourishes just where the rubber tree is found, and during the season all other work, even rubber gathering, is given up for this work. The nuts, as we know them, are contained from ten to twenty together in a large case resembling a cocoa, which has to be cut open before the nuts can be obtained. The work of collecting is by no means a safe one, the heavy cases often falling from a height of one, even two hundred feet, and instantly killing anyone upon whom they may fall. The collectors often protect the heads and shoulders by means of heavy umbrella-like shields. Statistics of the extent of the export of these nuts are quite surprising. The amount reaches to entire ship-loads. They are not only used for eating purposes. Brazil nut oil has many uses in the arts. In their own country they form a much more important article of food than among us. Variously prepared they enter into the composition of many delicious table dishes. Nor are they without medical interest. In that mild climate Brazil nut oil serves a purpose very similar to that of cod liver oil among us. I have seen undoubted recoveries of consumptive patients to whom nothing except unlimited quantities of this oil had been administered. But it would scarcely do in our climate.

Referring to the vegetable wealth of Brazil, it is to be considered that as yet it is almost wholly unknown, notwithstanding the vast revenues that it has already yielded to that country. The history of all other countries has been that very shortly after the discovery, the settlers have begun to develop their agricultural resources. Not so in Brazil, at least in the Amazon valley. Beyond a small—a very small—fraction of the food supply necessary for its own people, this valley furnished no agricultural products. All the energy and enterprise of those who have resorted there has found full scope in culling out the richest of Nature's unaided productions. And even in this direction we have merely entered upon a knowledge of her vast resources.

In the precious woods of Brazil alone there is an industry capable of enriching a nation. Some author has begun a simple enumeration of the useful woods of Brazil, giving only their names and synonyms in alphabetical order. Thus far he has only progressed through a few of the first letters of the alphabet, and the result is a good-sized volume. So abundant are these hard and fine woods that the difficulty is to find a coarse or soft wood sufficiently easy of being worked to serve for building purposes. I have observed that the valuable portion of most of these precious woods is confined to a small portion of the heart; the sap wood surrounding it being of a very different colour as well as very much softer.

Another peculiarity of these Brazilian species of woods is that they are not gregarious, as ours are. That is to say, we do not find a forest made up largely of one or several species, but all sorts grow together, not more than one or two of a given kind being obtainable in one place. This increases greatly the difficulty and expense of collecting them. Two enterprising firms are said to have established saw mills on the island of Maranho, in the mouth of the Amazon.

From here they send out little tugs to bring in the passing logs, which constitute their only supply.

The fibre plants of Brazil are already attracting a great deal of attention, and I expect they will yet revolutionize the woven fabrics of the world. Their name is legion, and they represent many diverse families, and it can hardly be that among them there are not some equal or superior to any now in use.

The discovery of aniline dyes has ruined the trade in those of the vegetable origin, otherwise the forests of Brazil would have furnished a mine which the workings of centuries would not have sufficed to exhaust. Many times in pressing our botanical collections we would find our papers, and even our clothing, beautifully and permanently dyed by the roots, bark or leaves of the plants that we had collected. Again we would observe a stream or pool deeply tinged by the exudation of some log that had fallen into it.

The food plants of Brazil, if we include those introduced, includes about everything known to tropical countries. Introduced fruits soon run wild. Thus the peanut, the yam and the cacao, origin of the chocolate, may be found escaped in every direction. The cacao especially attracted our attention, for we found entire forests of it in some places. Of coffee we find several native species, and wild specimens of the Arabian species are not rarely met with. One of the native species has white seeds, as has also a native species of theobroma. No food plant flourishes more abundantly than the cassava, there called mandioca or yuca. Of this there are several species, one of which occurs wild in the greatest abundance. The plant is in the euphorbia family, near rubber, and produces large sweet potato-like tubers. In its fresh condition it is a deadly poison, but when cooked it furnishes a wholesome food. The best varieties, baked in the ashes, are equal to our best potatoes. From these roots, after they have been macerated almost to the point of putrefaction in order to destroy their poisonous principle, a starchy food, mandioca, is obtained, which answers in Brazil the purposes of bread.

I close my remarks with a brief account of the drugs of this interesting country. Should any genius ever be born capable of writing a complete history of the medicinal plants of Brazil, it would probably constitute the most interesting and important contribution of its class. Indeed, the elaboration of the medical flora of even one of the Brazilian provinces would be the work of a lifetime. Each tribe of aborigines and each community of settlers has its own native materia medica, and of the virtues of many of these plants there can be little doubt. Aside from these strictly domestic remedies, the region affords to civilization some of its most useful drugs, and every year is adding to the list.

One of the most interesting of these is guarana, the virtues of which as a remedy for migraine are rapidly becoming appreciated. It is the product of the seeds of *Paullinia sorbilis*, a plant quite nearly related to the horse chestnut. There is much false information afloat concerning this drug, and I have taken pleasure in investigating the real facts concerning it. The plant is a woody vine of considerable size, existing naturally in many parts of the Amazon valley. Considerable portion of the drug, however, is the product of the wild plants, it being extensively cultivated in the Maderia region. Under cultivation its appearance is quite changed. Instead of being allowed to climb wildly it is trained to stakes, as is the grape in many sections, so that at a distance a plantation bears much resemblance to a vineyard. The white flowers are borne in terminal panicles, and are small and inconspicuous except by being massed together. The fruits begin to ripen in December, as indicated by their bursting open and exposing the seeds, about equal to a hazel nut in size. No time is then lost in gathering the harvest, lest the seeds fall to the ground and become lost. From the outer husks, resembling those of a small hickory nut, the seeds are shelled out with the finger, a very laborious process. The pulp, a white, phlegmy substance, is then washed in the river. The seeds are then most carefully roasted and placed in sacks and beaten to remove the cartilaginous shell. They are then roughly milled in a small hand mill or in a wooden mortar, an exact quantity of water added, and the whole kneaded into a doughy mass. This mass is then moulded by hand into rolls, which are carefully dried by a process requiring several weeks of diligent attention, and are ready for the market. Contrary to the general belief, no adulteration or substitution of any kind is resorted to, these Indians vieing with one another in the manufacture of the best product. The reason that failure has universally attended attempts to manipulate the seeds in this country is that the process requires a great amount of time, patience and experience, which have not been given to it.

The ipecac plant is found on the upper branches of the Maderia. The causes of the present scarcity and high prices are twofold. In the first place the known localities have been largely exhausted, and new explorations have to be undertaken to secure supplies. But another influence of much greater importance is the growth of the rubber industry, which has monopolized the attention of the settlers. Until this interest shall decrease, or until the population of those sections shall become largely increased, steadily cheap supplies of ipecac can scarcely be looked for. It is this fact which gives added interest to my new drug cocillana, which embodies to a great extent the properties of ipecac.

The copaiba tree is one of the handsomest trees of the Brazilian forest. It is not to be classed among the larger trees, yet it often reaches a diameter of five or six feet. Its wood is extremely hard and tough, and is used for various important purposes. A dug-out from this tree often serves as the basis of the strong boats by which the dangerous rapids are navigated. A cross section of the trunk, properly trimmed, constitutes the rude cart wheels of the section. The seeds of the tree when dry resemble bleached bone in colour and hardness, and are used by the savages for making beads.

Very similar to the copaiba tree is the related tree, *Dipteryx odorata*, which yields us tonka beans. With its tall and polished trunk, surmounted by the most dense head of dark and glossy leaves, it constitutes a stately ornament, and during the fruiting season loads the air with the vanilla-like fragrance of its seeds.

The vanilla also grows wild here, and the beans, of poor quality, are sold at 10 cents each.

The jaborandi fringes the river banks, the pariera climbs over the smaller trees, and the sarsaparilla covers the little elevations. Other drugs exist in rich profusion, but I can only refer to them by name, the strychnos, manaca, stachytarpheta, soliman, barbasco and chamairo.

I confidently expect that in the future, when rational methods of examining and comparing the effects of drugs shall have become more general, many of the drugs now used only by the savages of Brazil will replace the similar agent in use by us.

OIL OF PEPPERMINT—EXAMINATION FOR ADULTERATION.*

BY H. W. SNOW.

Large buyers of oil of peppermint will doubtless, like the writer, welcome any addition to the methods, chemical or physical, which have for their object the testing of this oil for adulteration. For this reason

* *From The New Idea*, March.

the writer needs no apology for appearing as a contributor in this field of chemical literature. In the following paper, alcohol, the oils of camphor, turpentine and copaiba, as adulterants are considered. In addition to these the oils of pennyroyal, Japanese peppermint and erigeron are named as falsifications. Probably, however, the most vicious contamination, whether wilfully added or the result of careless growing, is that of the so-called ragweed oil and other "weed" oils, many of which materially lower the quality of the oil even when present in very small quantities. Physical properties, especially when coupled with careful fractional distillation, afford the only means at present known for detecting the presence of some of these oils, though for others means are at hand which are of considerable value in determining their presence.

Alcohol has been named as having been freely used as an adulterant, but the writer does not believe it to be so used to any considerable extent, though it is always a possible addition. Magenta makes a reliable test for its presence. This aniline product is insoluble in oil of peppermint, free from alcohol and moisture, though most samples of the commercial oil will dissolve it in small proportion. In examining twenty samples of oil only one was found not to dissolve the dye at all, and two others took it up in very small proportion, the rest on warming dissolved noticeable quantities. If alcohol were added at all it would scarcely be in less than 5 per cent. quantities, and this amount is easily detected by shaking the oil with a few grains of the reagent for fifteen or twenty seconds; use no heat. With 5 per cent. or more of alcohol the oil will be coloured a distinct red. Light tints may be disregarded, and are probably due to the presence of small amounts of moisture. One or two trials on known material will quickly teach the analyst how much colour is permissible, and render the detection of any important quantity of alcohol an absolute certainty. In the examination of eighteen samples of oil only two (from the same house) were found to contain alcohol, and even these two contained it in small amounts, probably added to aid in concealing some other adulterant, as one of them afterwards (only one was examined) was found to contain turpentine.

Oil of Camphor.—The writer's experiments on this adulterant were confined to the trying of Mr. A. B. Stevens' nitric acid test.* According to Mr. Stevens, it is applied as follows: Place a drachm of nitric acid (sp. gr. 1·42) in a test tube, and add one or two drops of the suspected oil, and after gentle agitation set aside for a few minutes. The mixture will be of a yellow colour, and if pure will remain so. If as low as 5 per cent. of oil of camphor be present the mixture will turn red in fifteen or twenty minutes. The writer can heartily endorse this test, and in addition may offer a few remarks. A perfectly good quality of oil will change colour but very little on this treatment, and assumes a light straw yellow colour, which becomes lighter, if anything, on standing, but on applying the test to commercial oils it will often be found that they will assume a reddish brown colour. This is not to be mistaken for the colour produced by oil of camphor. The reddish brown fades on standing two or three hours, but the colour of oil of camphor, a distinct red, will remain for thirty or forty hours, and perhaps even longer. The reddish brown often obscures for a time the test for oil of camphor, but on allowing the test tube to stand over night the brown will fade and leave the reddish colour, if oil of camphor is present, distinct and unmistakable. This test will reveal with perfect ease as little as 5 per cent. of oil of camphor. Another advantage of it is that it can be applied for the detection of oil of camphor in other oils beside peppermint which give no colour, but a little colour or a fading colour with nitric acid. In the examination of twenty samples of commercial oil of peppermint by this means, six were found adulterated with oil of camphor. Of these five were obtained from Michigan firms, one being from a jobbing house, and one was obtained from a New York house.

Oil of Turpentine is generally spoken of as a probable adulterant of essential oils, and is specifically mentioned as being added to oil of peppermint. Among other tests great stress has been laid on the *rotation of polarized light*, the *fulmination with iodine*, and the solubility in an *aqueous alcohol*. With the specific rotatory power the writer has no experience, but nevertheless is justified in warning against too implicit a reliance in this test. Its positive results, when coupled with fractional distillation, may perhaps be, and doubtless are, trustworthy, but as to its negative results, it must not be forgotten that *French oil of turpentine* rotates polarized light in the *same* direction as oil of peppermint, and according to a statement now before the writer, nearly as far (—35°) as the lower average of peppermint oil. It is highly probable that this known fact of the difference between American and French turpentine has already been taken advantage of to nullify the optical test for turpentine in oil of peppermint.

Aqueous alcohol.—Oil of peppermint is completely soluble in its own volume of 80 per cent. by weight alcohol, but on the other hand, oil of turpentine is as completely insoluble in an equal volume of alcohol of this strength. This difference between these two oils has been recommended as a means of detecting the latter when added to the former, but whoever first announced this test must certainly have overlooked the fact that the two oils are *mutual* solvents, and that therefore their solubilities when in mixture will be greatly different from either of the oils when separate. This is such a common occurrence in solubilities that it is somewhat surprising it should not have been taken into consideration. As a matter of fact, 80 per cent. alcohol is worthless as a test for the presence of turpentine in oil of pepperment. The usual test of equal volumes will overlook the presence of 30 per cent. and only begins to show the presence when 40 per cent. of turpentine has been added, and increasing the amount of dilute alcohol employed, does not, as one might suppose, increase the exactness of the test. Further, when a little alcohol is also added with the adulterant, as we have reason to suspect is sometimes done, then 50 per cent. of oil of turpentine escapes notice by this test. Long before such amounts are reached the adulterant may be detected by the sense of smell. This test, it will thus be seen, is a *false reliance*, and is doubtless a favourite with unscrupulous dealers in essential oils.

Distillation with Chlorinated lime and water is mentioned for the purpose of directing attention to the fact that chloroform is yielded in small amounts, and may be detected by filtering the distillate through a well wetted filter paper and applying the *isonitrile* test for chloroform. It was long ago recorded that turpentine yielded chloroform when thus treated, and in experimenting to determine whether this fact might be made a means of detecting turpentine in oil of peppermint it was noted that this latter oil also yielded chloroform.

Iodine Absorption. — Elsewhere the writer has directed attention by a short paper to the iodine absorption of essential oils as a means of determining their purity. The work is far from complete, and the writer has thus far only made a practical application of this property of oils in the case of the detection of oil of turpentine in oil of peppermint with a possible detection of oil of copaiba. The writer is scarcely in a position to fix the absolute variation of

* 'Proc. Amer. Phar. Assoc.,' 1888, 97; *Amer. Drug.*, Oct, 1888, 192; and in other English reprints.

the iodine absorption for peppermint oil, but this is not essential to success in its application. In its determination for eighteen commercial oils, a considerable number of which were known to be adulterated, a very considerable range was found running between 24 parts and 179 parts of iodine to 100 parts of oil, as described elsewhere in this issue. Ordinarily it is found between 70 and 110. In one case a very satisfactory and high-priced oil, purchased some years ago, and before sharp and unscrupulous competition had injured the quality of oil of peppermint, showed an absorption of only 24. In another case an equivalent of 179 was found. But it yet remains to be seen whether this latter oil was pure or not, and whether true oil of peppermint will run so high as this. Where considerable amounts of turpentine have been added, iodine absorption will indicate it when determined direct for the oil, but it is always safer to resort to fractional distillation and compare the iodine absorption of the fraction with that of the oil undisturbed by distillation. The more thorough the fractionating is done the better, and the small fractional distillation flasks of 4 oz. and 2 oz. capacity serve the purpose well. The following is a good procedure :—

(*a*) From 4 ounces of oil fraction off a fourth. Take this fourth (1 ounce), and again fraction it, taking only one-eighth (1 drachm.) After allowing this latter fraction to stand until the drops of water which will usually be obtained have subsided, determine the iodine absorption and compare it with the figures obtained from the undisturbed oil. In the case of an oil free from turpentine we may expect to find the two figures not very far separated, with the probability that the iodine absorption for the fraction will be somewhat higher than for the original oil. In the presence of turpentine the iodine absorption for the fraction will be much higher than for the natural undisturbed oil. Thus, in an oil whose iodine absorption was 105, when only 1 ounce was taken and fractioned, the iodine absorption was found to be 123, and when to another portion of this same oil 13 per cent. of turpentine was added and a one drachm fraction from 1 ounce as in the previous case was determined for its iodine absorption, this was found to be 280. With the double fractionating suggested more perfect separation can be obtained, and the result will correspondingly be more secure when dealing with small amounts of turpentine. Also experience to date justifies the statement that an oil yielding, from the fraction of 1 drachm from 1 ounce, less than 125 for its iodine absorption is not very likely to be adulterated with turpentine. Only once thus far has the writer found an oil having a higher absorption in the original than this, and as already stated that oil is still open to question. If the oil exceeds 125 it is a suspect and running over 185 may be discarded. With much turpentine present the fraction will have an absorptive power over 225. After careful fractional distillation the turpentine may often be detected by its odour. The absence of alcohol should first be proven.

Oil of Pennyroyal.—The only test for oil of pennyroyal which the writer has seen is the chloral sulphuric acid test. It has already been pointed out that this test is unreliable, and the writer's work simply confirms that of previous investigators in this respect. Oil of peppermint alone gives too deep a colour for it to be easy to distinguish the less marked olive green which oil of pennyroyal gives, and it is only when the amounts become considerable that it is easy to note its appearance, and even then the reaction does not seem to be uniform. The writer has not searched the commercial oils particularly for this adulterant, but casually noted its presence in two oils, one of which contained it in such quantities as to be distinctly noticeable from its odour.

Oil of Copaiba.—The iodine absorption of oil of copaiba as determined from a single sample was found to be 250. According to Fluckiger the boiling point of this oil is very high (245° C. and over), and it was thought these two properties might be of service in its detection. An oil was taken, and after determining its iodine absorption it was fractionated, retaining a fourth in the retort; the same oil was then adulterated with about 20 per cent. of oil of copaiba, and after fractionated in like manner the iodine absorption was determined for the residue. The three figures were 110, 129, 193, so that it will be seen that the oil of copaiba increases the absorptive power of the last fraction remaining in the retort, but its own absorptive power when perfectly pure is not sufficiently high to make it increase this power very much over the variations which may perhaps be found to occur in the case of different samples of oil of peppermint. However, by comparing the iodine absorption of the undisturbed oil with that of the last one-fourth fraction remaining in the retort, some data will be found which will be suggestive of the probable purity or sophistication of the oil as regards copaiba. In this connection it must be mentioned that in fractionally distilling for this last purpose a small retort is to be preferred to the regular fractional distillation flask, because the higher boiling point of the latter portions leads to the condensation and dropping back into the flask of the oil to an extent which brings the distillation to a close.

Chloroform Solution of Chloride of Gold.—In their deportment towards a chloroform solution of chloride of gold, the essential oils show in some cases differences so far as tried. When only two or three drops of oil are boiled with 5 c.c. of a 1 in 200 solution, oil of turpentine reduces the solution very quickly and with little or no colour. Spangles of gold are seen to adhere to the side and bottom of the tube. Oil of camphor acts but little and only slowly developing a faint blue to violet colour. Oil of Japanese peppermint gives no colour or reduction. Oil of pennyroyal reduces it a little, giving a dark colour somewhat greenish. Oil of peppermint on the other hand reduces the solution quickly, giving first a brown and then beautiful brownish red, gradually passing into a violet red with cloudiness. Oil of copaiba reduces the solution somewhat slowly, but on standing a few moments yields a beautiful blue solution which gradually fades. Some experiments were undertaken to see how far this might be applied to the detection of oil of copaiba in oil of peppermint. It must be confessed at the start that the indications are not so encouraging as they might be, but they were such as to justify a mention of the results. With considerable amounts of oil of copaiba present (20 per cent. more), there is little or no difficulty experienced in noticing its presence, especially when compared with an oil of known purity beside it. The colour of the solution is violet with marked tendency to the blue. With amounts of only about 10 per cent., however, the colour approaches rather too nearly that afforded by pure oil of peppermint to make the distinction a close one. In the latter case it is indispensable that two or three samples of oil of peppermint of known purity should be at hand to compare with the suspected samples, experiments being made parallel with and under the same conditions as those on the oil under investigation.

This colour test, like most of its class, unless used with caution is apt to mislead, and with small amounts of adulterant the judgment drawn from its indications should be qualified. By its means it is easier and safer to demonstrate the absence of oil of copaiba than its presence. Only five oils were examined by this test, four of which were certainly free from the adulterant. The fifth gave indications of its presence, but was also known to be heavily adulterated with oil of camphor, so that it is possible that the combination gave a test simulating that afforded by oil of copaiba.

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BRITISH PHARMACEUTICAL CONFERENCE.

THE approaching re-visit of the British Pharmaceutical Conference to its birthplace has naturally evoked an unusual amount of local interest. Newcastle and its populous surroundings have furnished a strong committee of local pharmacists, which has through Messrs. MARTIN and CLAGUE submitted a well-considered programme that has in its leading features been heartily endorsed by the Conference Executive. The pink circular will be in the hands of members shortly, and in the meantime we are able to give an outline of the arrangements which will be of interest to the large number of our readers, who are looking forward to this year's meeting.

The University of Durham College of Science has placed a very fine suite of rooms at the disposal of the Conference for its sessions. The President (Mr. C. UMNEY, F.I.C., F.C.S.) will deliver an address, and will inaugurate the business and scientific work which will occupy the usual hours on the Tuesday and Wednesday. The President's reception on Monday evening, September 9, will be the prelude to a specially interesting series of social entertainments, which will include a drive through the parks, and a garden party in the lovely public park, Jesmond Dene (Lord ARMSTRONG'S gift to Newcastle), on the Tuesday evening. The busy Tyne, with its ship-yards, ironworks, chemical works and coaling staiths, will be the objects of interest in an excursion down the river on Wednesday evening. This will be followed by the popular smoking concert, which will be held at head-quarters, the County Hotel. On Thursday, leaving behind the busy haunts of men and the rush of modern manufacturing centres, the Local Committee will conduct their guests to Hexham, whose historic associations and proximity to the Roman Wall will be of interest to many, while its sylvan beauty will delight all. Thence up the beautiful valley of the North Tyne and on to Rothbury to the hills of north Northumberland and the beauties of Cragside, the seat of Lord ARMSTRONG.

A special feature of this Conference is that a number of ladies interested have formed a committee for the purpose of entertaining the ladies who accompany members of the Conference to Newcastle. We trust that this useful step will be successful and permanent.

REGISTRATION OF PATENT AND TRADE-MARK AGENTS.

THE Patents, Designs and Trade Marks Act of 1888, to which attention was directed last year when the Bill was before Parliament (see *ante*, p. 9), contains a provision that no person shall henceforth be entitled to describe himself or practise as a patent agent unless he be registered. The Board of Trade was also empowered by this Act to make regulations for giving effect to this provision as soon as possible after the passing of the Act. In accordance with these provisions rules have now been drawn up and published by the Board of Trade to the following effect. The register of persons practising as patent agents is to be kept by the Institute of Patent Agents, subject to the rules now laid down and to any future orders of the Board of Trade in pursuance of the Act. This register is to contain the names of all recognized patent agents, with their addresses, dates of registration and mention of any honours, memberships or other additions which the Council of the Institute may consider worthy of record. A correct copy of the register is to be printed once every year under the direction of the Institute and published for sale on the 31st day of January in each succeeding year. A copy of the register for the time being is to be admissible as evidence of all matters stated therein and the absence of the name of any person from the register is to be evidence that such person is not registered in pursuance of the Act until the contrary is made to appear otherwise. The registrar is to be appointed by the Institute, and his conduct of the business connected with the office is to be in accordance with the provisions of the Act and the rules of the Board of Trade, as well as subject to the direction of those bodies. Persons who have been *bonâ fide* in practice as patent agents prior to the passing of the Act are eligible for registration on presentation of a statutory declaration to that effect according to a form given in one of the schedules to the rules now issued, but power is given for the Board of Trade to require further proof that a person is eligible for registration if it be thought requisite. Subject to the provisions of the Act in this respect no person will be entitled to be registered as a patent agent unless he has passed a final qualifying examination as to his knowledge of patent law and practice and of the general duties of a patent agent, such as the Institute may from time to time prescribe, and a certificate that this has been done must be produced under the seal of the Institute before any person can be placed on the register. Persons desirous of obtaining qualification in this way must have passed the matriculation examination at any university in England, Scotland or Ireland, or the Oxford or Cambridge middle class senior local

examinations, or the examinations of the Civil Service Commissioners, or such other examinations as the Institute of Patent Agents may by regulation prescribe with the approval of the Board of Trade. The only exceptions to this rule are in the case of persons who have been for at least seven consecutive years engaged as pupils or assistants to one or more registered patent agents, or persons for the time being entitled to practise as solicitors of the Supreme Court of Judicature in England or Ireland, or as law agents before the Court of Session in Scotland, and these are to be entitled to registration as patent agents without passing any other than the final examination above mentioned.

For the final qualification for registration the Institute of Patent Agents is required to hold an examination at least once in each year, commencing with the first day of July, 1889, and subject to the rules now laid down the Institute is to have the entire management and control of all such examinations, with power to make from time to time regulations as to the subjects for and the mode of conducting the examination of candidates, the times and places of the examinations, and the notices to be given thereof, the certificates to be given, the appointment and removal of examiners, and their remuneration, as well as any other matter or thing as to which the Institute may think regulations are necessary for the purpose of carrying out this rule. In regard to the proper keeping of the Register the Registrar is empowered to insert in the Register any alteration which may come to his knowledge of the name or address of any person registered. He is also empowered to erase from the register the name of any registered person who dies, or has ceased to practice as a patent agent. For that purpose he may send by post to the registered address of any registered person, a notice inquiring whether or not he has ceased to practice. If no reply is received within three months a further notice is to be sent, and if this be returned through the dead letter office the name of the person in question may be erased from the register.

An important feature of this system of registration is the annual fee payable of three guineas, which may be expected to have a wholesome influence. If this fee be not paid within one month from the day on which it becomes payable annually, notice may be sent that it is to be paid by a specified time, and in default of payment within one month from the time named the name of the person is to be erased from the register, but subject to the possibility of restoration by direction of the Institute or Board of Trade, and on payment of the fee due together with such further sum that may be required as a fine. Rules are also laid down for cases in which persons aggrieved by any order, direction or refusal to register may appeal to the Board of Trade, and for the hearing of such appeals. These rules came into operation on the 12th day of the present month, and there is reason for believing that they will have a very beneficial influence upon the transaction of business connected with patents and trade marks.

The *Oil, Paint and Drug Review* states that after an interval of eight years the poisonous Japanese star-anise, or "shikimi," has reappeared in the New York market. Thirty cases that were offered for sale as star-anise proved on examination to consist of a mixture of the true with the poisonous fruit, nevertheless the consignment was afterwards put up to auction and sold to seven different persons at four or five cents per pound. The State Board of Health, having been informed of the dangerous character of the transaction, intervened, traced all the buyers, and took charge of the parcels pending further investigation. According to Professor Eykman, who investigated some cases of poisoning by shikimi fruit some years ago (*Pharm. Journ.*, [3], xi., 1068), the Japanese anise differs from star-anise in having a disagreeable taste and an odour faintly resembling laurel, cloves and nutmeg. The fruit is also somewhat smaller than true anise, more shiny and red-brown, with the beak thin, frequently bent strongly upwards or crooked backwards; the carpels are more woody, much shrunk in upon one another and wrinkled, while the seeds are mostly of a yellow-brown colour with a stout keel and raised apex. Figures of the two fruits will be found in a paper by Mr. E. M. Holmes (*Pharm. Journ.*, [3], xi., 489).

* * *

According to the *Bulletin* of the Brussels Royal Society of Pharmacy the Belgian Parliament has passed a law imposing a duty of 140 francs the kilogram upon saccharin and any products in which it occurs to the extent of more than one-half per cent.

* * *

According to a recent report by Mr. Consul Peyton considerable interest has been excited in Mogador by the arrival in that port from the interior during last year of seventy-three tons of "the valuable gum senegal or Soudan gum." It is supposed that a great part of this gum has been brought westward by caravans, instead of being sent to Egypt or Algeria, in consequence of the continued disturbed state of parts of the Soudan.

* * *

We understand that Mr. H. Bellyse Baildon is a candidate for the Chair of English Language and Literature in the University of Glasgow.

* * *

A sad fatality is reported from Oxford, where Mr. Edgar George Wilson, assistant to Mr. Luff, Pharmaceutical Chemist, lost his life by drowning, after he had rescued two boys from the river into which they had fallen. We understand that Mr. Wilson had entered his name for the forthcoming competition for the Bell and Redwood Scholarship.

* * *

The first of a series of demonstrations in practical botany, by Mr. S. F. Burford, F.C.S., in connection with the Leicester and Leicestershire Chemists' Association, was given at the New Botanical Garden, Abbey Park, on Tuesday, the 25th inst., at 6·30 a.m. Though the weather was somewhat dull there were over twenty students present. The beds, which are twenty-four in number, together with a pond for aquatic plants, are in a promising condition, though not yet quite finished. Amongst other plants in flower were especially noticeable *Aconitum Napellus*, *Atropa Belladonna*, *Althæa officinalis* and *Rheum officinale*, etc.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

June 19, 20 *and* 21, 1889.

Present on each day—Mr. Carteighe, President; Mr. Bottle, Vice-President; Messrs. Blunt, Bowen, Corder, Druce, Fletcher, Gale, Gerrard, Greenish, Ransom, Saul, Symons, Tanner, Taylor and Thresh.

Dr. Stevenson was present on the 19th and 20th, on behalf of the Privy Council.

MAJOR EXAMINATION.

19*th.*—*Eight* candidates were examined. *One* failed. The undermentioned *seven* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Allen, Willie.....Basingstoke.
Barker, Joseph.....Doncaster.
Carman, Frederick Henry .....Lowestoft.
Dennis, Fred Woodrow .....Louth.
Duffin, Charles William.....Wakefield.
Heap, Isaac Henry .....Hanley.
Neville, Thomas Crofts .....Leamington.

20*th.*—*Nine* candidates were examined. *Three* failed. The undermentioned *six* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Gardner, John .....Bolton-le-Sands.
Saville, Edwin.....York.
Tharratt, George Row.....Louth.
Vincent, John .....Watton.
Wansbrough, Edwin G. Lincoln Barrow-in-Furness.
White, Thomas Arthur ..... .Basingstoke.

MINOR EXAMINATION.

19*th.*—*Twenty* candidates were examined. *Fifteen* failed. The undermentioned *five* passed, and were declared qualified to be registered as Chemists and Druggists:—

Appleby, George Henry.. .....Stow-on-theWold.
Bonnett, Frederick .....Doncaster.
Cheney, Henry Robert .....Banbury.
Elgie, Simon Kelsey .....London.
Hampshire, Frank Reginald...Wakefield.

20*th.*—*Twenty-one* candidates were examined. *Eighteen* failed. The undermentioned *three* passed, and were declared qualified to be registered as Chemists and Druggists:—

Heath, Walter George ..... .Norwich.
Negus, John Henry..... Northampton.
Parker, Robert.....Rishton.

21*st.*—*Twenty-five* candidates were examined. *Eleven* failed. The undermentioned *fourteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Bullock, John William ..... Blackpool.
Heaton, George Edward.....London.
Pilkington, William .....Buxton.
Rees, David Charles .. ..Ipswich.
Tapp, Charles .....Sittingbourne.
Taylor, Joseph John .....Sittingbourne.
Thorp, Edwin .....Harrogate.
Thursfield, John Henry ... .Kettering.
Tottle, Samuel Harpham .....London.
Twigg, Paul O'Brien .....Bath.
Waddy, Ernest Alfred .....Bristol.
Walwin, Walter .....Warminster.
Willis, Charles John .....St. John's Wood.
Wilson, Harry Lancelot.....Norwich.

PRELIMINARY EXAMINATION.

21*st.*—Certificates by approved examining bodies were received from the undermentioned in lieu of the Society's examination:—

James, Fenwick ... .Workington.
Page, William Irwin ....Kennington.

Proceedings of Societies in London.

BRITISH PHARMACEUTICAL CONFERENCE.

A meeting of the Executive Committee was held at 17, Bloomsbury Square, on Thursday, June 20, at 4.30 p.m. Present, Mr. Umney, President, in the chair; Messrs. Carteighe, Clague, Davies, Gerrard, Groves, Martin, Ransom and Mr. Martindale (Hon. Treasurer), Dr. Thresh, and Mr. Naylor (Hon. Gen. Secs.), and Mr. Nightingale (Assistant Secretary). The minutes of the previous meeting were read and confirmed. Intimations of inability to attend were announced as having been received from Messrs. Atkins, Benger, Dott, Harrison, Maben, Plowman, Proctor, Stephenson and Symes.

The following summary of arrangements in connection with the forthcoming Annual Meeting of the Conference at Newcastle was submitted by Mr. Martin and Mr. Maltby Clague (Local Secretary for the Newcastle Meeting), who were deputed to represent the Local Committee.

They reported that the use of the University of Durham College of Science had been granted for the sittings of the Conference. There would be a reception by the President and officers of the Conference on the evening of Monday, September 9, at 8 to 8.30, to be followed by a Conversazione. The headquarters of the Conference would be the County Hotel. After the business meeting of Tuesday, members would be conveyed by carriages to Jesmond Dene. The social part of the programme of the succeeding day would include a journey to Tynemouth and back by steamer.

An excursion had been mapped out for Thursday Members would travel by special train to Hexham, where opportunity would be afforded them of viewing the Abbey Church and town antiquities. Luncheon would be served at the Hydropathic Mansion. Members would then resume their journey by train to Rothbury, via North Tyne Valley, and visit Crayside, the seat of Lord Armstrong. After tea the return journey would be made so as to reach Newcastle about 8.

Dr. Thresh said that he believed the Committee would be unanimously of opinion that the proposed arrangements of the Local Executive for the Newcastle Meeting were eminently satisfactory, and he proposed "That the proposed arrangements be agreed to, and that the best thanks of the Committee be given to Messrs. Martin and Clague, who had so kindly come all the way from Newcastle to submit and explain them." The proposition was seconded by Mr. Martindale, and heartily endorsed by all present.

The deputation then informed the meeting that a ladies' committee had been organized for the purpose of variously entertaining, during the sitting hours of the Conference, ladies who accompanied the visiting members. In reply to an inquiry from Dr. Thresh, Mr. Martin stated that two sets of tickets would be issued, one at 5*s.*, the other at 10*s.* 6*d.*

The following donation was announced as having been received, and the thanks of the Committee were accorded to the donor:—'Annual Announcement of the Ontario College of Pharmacy,' 1889.

A number of gentlemen were elected members of the Conference.

ROYAL COLLEGE OF PHYSICIANS.

[Croonian Lecture.]

Relation between Chemical Structure and Physiological Action.

BY T. LAUDER BRUNTON, M.D., F.R.S.

(*Continued from page* 1015.)

Explanation of the Danger of Diseased Meat.

Some very interesting experiments by Bocklisch may perhaps explain this rarity of ptomaine poisoning. In experimenting with pure cultivations of the vibrio

†

proteus, better known as "Finkler's bacillus," he found that it did not seem to produce any poisonous substances, although it occurs in the dejecta of patients who have been suffering from sporadic cholera, and is supposed to cause the disease. It occurred to him, however, that it is never present in the human intestine as a pure cultivation, and that possibly the presence of another bacillus along with it might cause the formation of the poisonous products in sporadic cholera. He therefore mixed some putrefactive bacteria with it, and found that the mixed bacilli formed the highly poisonous substance, methylguanidine.

In the same way, it seemed not unlikely that cases of acute poisoning by meat or game may be due to the accidental presence of more than one kind of bacillus, leading to the formation of specially poisonous products. More especially is this likely to be the case if one of them is a pathogenic microbe which has already produced disease in the beast or bird yielding the meat and a certain amount of decomposition of its tissues before its death.

Importance of Ferments and Products of Albuminous Fermentation in Relation to Poisoning and Diseases.

Decomposition of Albumin.—Albuminous substances are of a very complex composition, and contain a huge number of atoms. In the process of decomposition by heat, as in burning or dry distillation, by putrefaction or by the action of enzymes, such as pepsin or trypsin, the large molecule of albumen becomes decomposed, yielding simpler substances. The huge albuminous molecule will not diffuse through vegetable parchment. The final products of its decomposition, such as compound ammonias and organic acids, diffuse readily. Between these two stages we find intermediate substances—albumoses and peptones.

Albumoses and Peptones.—Albumoses and peptones are amongst the products of normal digestion, but they are now acquiring a special interest from the discovery that, when introduced into the blood without passing through the liver, these digestive products may act as powerful poisons.

Albuminous Substances as Food and Poison.—It seems strange that food and poison should be so nearly allied, and that, while albuminous substances are indispensable for the maintenance of life, the substance into which they must be broken up before they can be assimilated will kill an animal if they are applied in the wrong way and are injected into the jugular vein instead of being absorbed from the intestine in passing through the liver. But a house is very necessary for people to live in, and if it has to be transferred from one place to another it may be occasionally, as in Chicago, mounted on rollers and moved on; but in this country we generally pull it down and rebuild it. In this process, as Hermann has well put it, we separate the bricks from one another, and then put them together again. The bricks are quite harmless, and are very useful when properly applied to building the house, but a brick may be a fatal weapon if misapplied by being flung at a man's head. The albumoses and peptones into which albumins split up in the process of digestion are much more readily absorbed than the albumins themselves would be, and when they are put together again in the proper way in the portal vein or liver they support the strength, maintain life, and do no harm, but only good, to the organism.

Poisonous Albumins—Fibrinogen.—Most of us, no doubt, have eaten and enjoyed sweetbreads, which sometimes consist of the pancreas and sometimes of the thymus gland of the ox, and have received nothing but pleasure and strength from doing so; but it has been shown by the gifted young physiologist and pathologist whose recent untimely death has been such a blow not only to his friends, but to scientific men throughout the world, Dr. Wooldridge, that the juice of the thymus gland, if injected into the veins of a rabbit, will cause almost instantaneous clotting of the blood throughout the body, so that a small portion of this albuminous juice, containing a kind of fibrinogen, kills the animal as quickly as a toxic dose of hydrocyanic acid or a bullet through its head.

Poisonous Digestive Products—Albumoses and Peptones.—The albumoses and peptones formed during digestion seem to have just the opposite action. They prevent coagulation altogether, and produce coma, convulsions and death.

Serpent Venom—Jequirity.—Moreover, the venom of serpents has been shown by Weir Mitchell, Reichert, and others to belong, in part at least, to this class of substances, and some vegetable poisons do so also, for in a most interesting research Martin has shown the jequirity poison to be an albumose. The poisonous action of albumoses is destroyed by boiling, and as the venom of the cobra is weakened but not completely destroyed by boiling, it is probable that it does not consist entirely of an albumose, but contains some other poisonous substance as well.

Diphtheritic Poison.—The interesting point in the relation of ferments or albumoses to disease is that the poisons formed by some disease-germs belong to this class. Thus Roux and Yersin have found that the poison of diphtheria has its virulence completely destroyed by boiling, just in the same way as the poison of the jequirity seed.

Products of more Complete Decomposition of Albumin, Alkaloids, Ammonia.—But as albuminous molecules become more broken up, the products of their decomposition no longer have their poisonous properties destroyed by heat. I may perhaps again be allowed to use a simile which I have employed on a former occasion* and liken the food we eat to the utensils which we use. A plate or a tumbler, although it might, like the brick, occasionally be awkward if used as a missile, can hardly be called dangerous; but when broken or splintered the fragments may cut or pierce, or inflict serious or even deadly injuries. If the fragments are large they can easily be cemented into a whole utensil, and thus be deprived of their injurious character. In like manner albumoses and peptones are built up into non-poisonous albuminous substances in the liver and portal vein. If the splinters are smaller it will be difficult or impossible to do this; and the ptomaines or alkaloidal substances resulting from the further decomposition of albumin may not undergo synthesis in the portal system, but pass through the liver, and act as poisons in the general circulation. But if we break these splinters by pounding them into fine dust, we may again make them almost completely harmless, and in the same way the final products of albuminous decomposition, ammonia and carbonic acid, have but a very slight poisonous action, and only kill when used in very large quantities, while the ptomaines, which may be likened to the splinters, are very deadly.

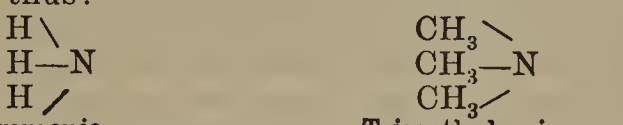
Ptomaines and Leucomaines.—The alkaloids formed by the decomposition of albumin in the dead body are termed "ptomaines," while those which are formed in the living body have received the name of "leucomaines."

Nature of Ptomaines.

The chemical constitution of all the ptomaines has not been ascertained, but a number of them seem to be compound ammonias. If one happens to be passing through a fishing village at certain times of the year, one may notice a peculiarly pungent, disagreeable smell from herring barrels. This smell is due to the substance, trimethylamine, a substance which some

* 'Disorders of Digestion,' p. 277. London: Macmillan and Co.

years ago was recommended as a cure for rheumatism. It consists chemically of ammonia, in which three atoms of hydrogen have been replaced by three of methyl; thus:



Ammonia. Trimethylamine.

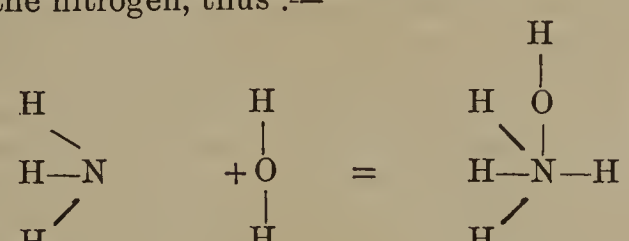
This substance is one of the products of decomposition of albuminous substances, and has been found by Brieger in rotten cheese, and also in the cadaver.

A similar substance, dimethylamine, in which only two atoms of hydrogen are replaced, is found in decomposing glue; but these substances, though hurtful to frogs, have little toxic power in mammals, and are of little importance in connection with poisoning.

Ammonia and Ammonium.—I have already mentioned that nitrogen, although generally trivalent, is sometimes pentavalent, and, while we write NH_3 as the formula of ammoniacal gas, the formula of ammonium chloride is NH_4Cl.

The hydrochloric acid, HCl, attaches itself directly to the ammonia or to the compound ammonias in which the hydrogen has been replaced by radicals. In the case of ammonia itself, we assume that a hypothetical substance, ammonium (NH_4), has been formed which behaves like the alkaline metals potassium and sodium. Consequently we term the compound thus formed ammonium chloride, as it corresponds to sodium chloride; but where we do not know the nature of the compound ammonia, as in some of the organic alkaloids like morphine, we term the compound hydrochlorate.

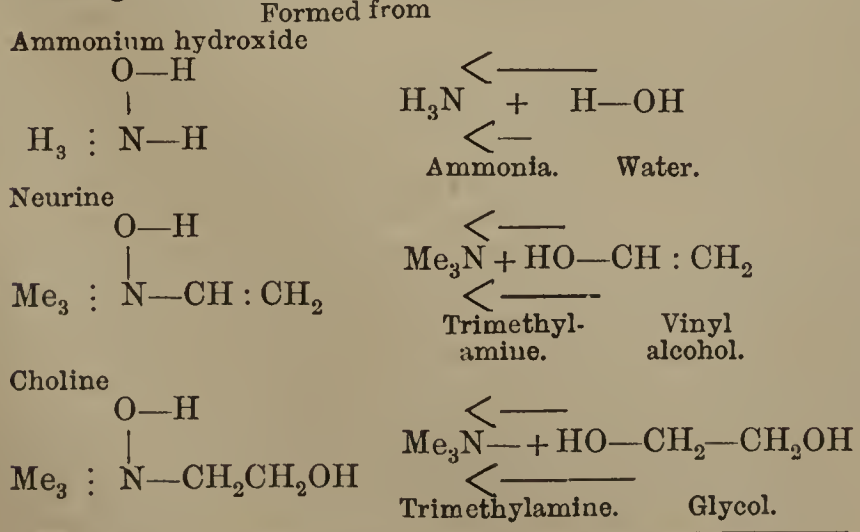
It is generally believed that a similar change from trivalent to pentavalent nitrogen occurs when ammoniacal gas is dissolved in water. It then combines with the water, the latter splitting up, and one atom of hydrogen combining directly with the nitrogen, while the remaining OH becomes attached by its oxygen to the nitrogen, thus :—



Ammonia gas. Water. Ammonium hydroxide (liquor ammoniæ).

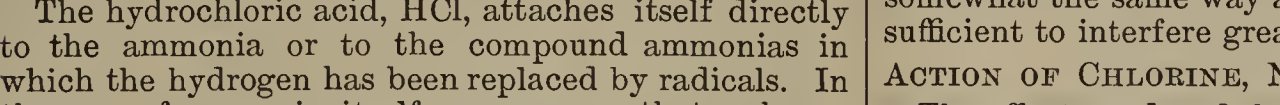
Some of the most important ptomaines are built of this latter type, namely, that of ammonium hydroxide. In them the four atoms of H are replaced by radicals, but they retain the hydroxyl (OH).

Formation of Ptomaines.—A glance at the accompanying table will show that three of the commonest (namely, neurine, choline and muscarine) may be formed from trimethylamine and alkyl radicals, in the same way as caustic ammonia is formed from ammoniacal gas and water.*



* Armstrong, *Journ. Chem. Ind.*, July 30, 1887.

Muscarine



An atom of hydroxyl passes from the alkyl to the nitrogen of trimethylamine, and the residue also becomes attached to the nitrogen. Choline was first prepared from bile, and hence its name, but it may also be obtained easily from yolk of egg. In small doses it has no poisonous action. In large doses it has somewhat the same effect as neurine, but the lethal dose is ten times as great.

Comparison of Choline, Neurine and Muscarine.

Choline, neurine and muscarine resemble one another very much in action, though varying enormously in their toxic power, muscarine being very much more powerful; possibly, also, though this point is not at all settled, choline and neurine have a certain tendency to paralyse the motor nerves and muscles in somewhat the same way as curare, although this is not sufficient to interfere greatly with their other actions.*

Action of Chlorine, Neurine, and Muscarine.

The effect produced by all three bodies may be shortly referred to one property, namely their power of irritating the peripheral extremities of nerves going to secreting cells or to involuntary muscular fibres. By stimulation of the ends of the nerves going to the glands they cause salivation, sweating, lachrymation, and increased secretion of the pancreas, liver, and mucous glands.

By irritation of the motor nerves going to involuntary muscular fibres they cause these muscles throughout the body to pass into a state of violent contraction, the pupil becomes contracted, and there is disturbance of vision, with spasm of accommodation; cramp-like spasms of the stomach and intestines occur, and cause vomiting and purging, and there is contraction of the bladder, spleen, and probably of the uterus. To this condition of increased contraction the heart forms a marked exception, because cardiac branches of the vagus nerve contain inhibitory as well as accelerating fibres, and stong irritation of the vagus nerve produces slow action or complete stoppage of the heart. At first muscarine causes slight quickening of the pulse and flushing of the face; but this is soon followed by slowness, and in frogs the irritation of the vagus is so great that the heart will remain motionless in diastole for hours.

The respiration is embarrassed and sometimes œdema of the lungs may ensue. This is ascribed by von Basch to the disturbance of the cardiac action, but I am still inclined to think that contraction of the pulmonary vessels may be one factor in the respiratory embarrassment.

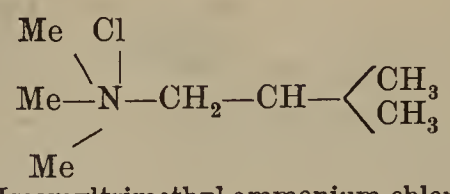
Antagonism of Atropine to these Alkaloids.—All the symptoms, whether produced by chlorine, neurine, or muscarine, can be rapidly and completely removed by atropine, which paralyses the identical nervous structures which are irritated by muscarine.

Relation between their Chemical Construction and Physiological Action.—From looking at the chemical constitution of those alkaloids, one might imagine that they owed their poisonous activity to the hydroxyl group, but this is not the case, because two other substances, similar in constitution but without the hydroxyl, produce similar effects to muscarine,† with the exception that they hardly contract the pupil at all.

* Neurine also produces fever in rabbits, Otto and Colmar (*Journ. of Phys.*, vol. viii., p. 218). I do not know whether the other substances do so or not, nor whether atropine prevents neurine from raising the temperature.

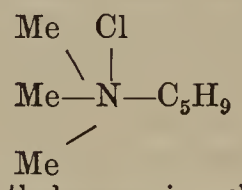
† Schmiedeberg and Harnack. *Arch. f. exp. Path. u. Pharm.* Bd. vi. p. 112.

These are:



Isoamyltrimethyl ammonium chloride.

And:



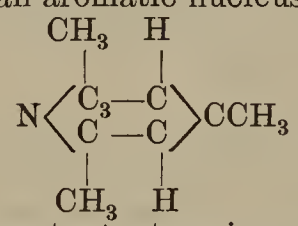
Valeryltrimethyl ammonium chloride.

What is the most peculiar, however, is that hexyltrimethyl ammonium chloride does not act like muscarine either on the heart or intestine.*

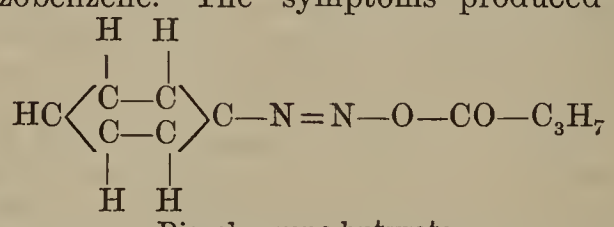
Relation of Ammonia to the Liver.—It is interesting to note that the ptomaines I have already mentioned are substituted ammonias, because, as we shall afterwards see, ammonia and some of its compounds have a very remarkable action upon the liver.

Aromatic Ptomaines.

You will have noticed that none of the poisons I have just mentioned contained any radicals of the aromatic group. But other ptomaines do; indeed the one which was first isolated by Nencki was collidine, which, like the others, contains three atoms of methyl, but associated with an aromatic nucleus.



Another most important ptomaine appears also to belong to the aromatic series, for Vaughan thinks that the poisonous alkaloid of milk and cheese, which he discovered and named tyrotoxicon, is really butyrate of diazobenzene. The symptoms produced by this



Diazobenzene butyrate.

alkaloid, which sometimes forms in milk during hot weather, are nausea, vomiting, headache, quick pulse, laboured breathing, constipation, and great prostration, with stupor. The pupils may be somewhat dilated, though not so much as in poisoning by atropine, and there may be also a scarlatina-like rash on the skin.

Practical Bearings of our Knowledge of Ptomaines.

High Game.—The practical outcome of the facts I have just brought before you is that there may be very great danger indeed of poisoning by alkaloidal substances formed in meat by its decomposition. Yet we know that while tainted beef is strongly objected to, high venison is looked upon as a delicacy, and the experiments of Bocklisch indicate that very probably the presence of two kinds of bacteria may be the cause of poisons being formed.

Tainted Meat.—Tracing the question a step farther, we ask: How are the two kinds of microbes likely to be present? And the simplest explanation is that the dangerous meat may have been got from a diseased animal, and the microbes present in its tissues may, by combining their action with that of ordinary putrefactive bacilli, have caused the formation of the deadly poisons. If this should be found to be the fact, it will clearly explain the necessity of avoiding as unfit for use the flesh of animals suffering even from the very earliest stage of acute disease.

Atropine as a Possible Antidote.—The fact that choline, and muscarine are amongst the commonest products of putrefaction indicates the advisability of employing atropine as a remedy in these cases of poisoning when the symptoms resemble those produced by these three bodies, and we may hope that ere long the risk of poisoning by milk or cheese may be lessened by an antidote to the tyrotoxicon being found, for a knowledge of its chemical nature indicates to us the direction in which an antidote is to be sought.

Action of Microbes in the Intestine.

Having considered the relation between disease and microbes living outside the body, we now come to discuss their action when they are taken into the intestinal canal, or applied to some absorbing surface such as that of a wound.

Microbes in the Intestine.—Bacteria abound in the intestine even in health, and some have thought that they might even aid the digestive juices in breaking up the food. It is quite likely that they aid in breaking up the food, but whether they do so with any advantage to the organism may be somewhat questionable. They tend to split up the products of pancreatic digestion farther than the pancreatic ferment would, and one of the substances to which they give rise is indol. This body has an antiseptic action, and belongs to the aromatic series, members of which, as I shall afterwards have to show, have a very marked action upon the liver. In the intestine it becomes converted into indican which is absorbed and excreted in the urine.

Indican in the Urine.—When the quantity excreted is excessive it indicates that albuminous matters are undergoing rapid decomposition. Unless there is some other locality where such a process is going on, as in an abscess, it usually indicates that bacteria are active in the small intestine, and, rightly or wrongly, I am accustomed to look upon much indican in the urine as an indicator for a mercurial purgative, mercury being one of the most powerful antiseptics we possess.

Poisons formed during Digestion.—The presence of bacteria is not necessary for the production of poisonous alkaloids in the intestine, for fibrin digested with pepsin yields a substance to which its discoverer, Brieger, has given the name of pepto-toxine. This substance belongs to the aromatic series, and I shall have again to refer to it when speaking of the action of drugs upon the liver. It causes drowsiness and feebleness, and may possibly be the cause of these symptoms in some cases of indigestion, but it causes no diarrhœa.

Diarrhœa is, however, one of the most prominent symptoms produced by neurine, choline, and muscarine. Two other alkaloids—mydaline, and another not yet named—which Brieger isolated from putrefying livers and spleens, have a still more powerful purgative action, producing almost continuous and fatal diarrhœa.

In all probability much of the diarrhœa which occurs, especially in children, after the use of milk is due to the formation of tyrotoxicon, or other more or less poisonous products, by the decomposition of the milk in the intestine itself. One of the most fruitful sources of diarrhœa in children is certainly the use of feeding-bottles with long tubes, which are generally imperfectly cleaned, so that even when the milk is put quite fresh into the bottle it becomes inoculated with bacteria before it reaches the child's stomach, where the temperature is just right for their rapid multiplication and the decomposition of the milk. The difference between the chances of a child fed at the breast and in this way is enormous, for in the former case the milk flows free from germs directly into the child's

* Jordan (in Schmiedeberg's Laboratory), *Arch. f. exp. Path. u. Pharm.*, Bd. viii., pp. 16 and 30.

mouth, and the risk of bacteria inoculation is greatly diminished.

Indeed, Andeer finds that in cows there is an antiseptic substance, resorcin, present in the udder, as if for the purpose of rendering the milk not only aseptic but antiseptic.

The possibility of contamination in the child's mouth itself suggests the advisability for careful supervision in regard to cleanliness of things put into it, even though it only be the mother's fingers or a teething-ring.

There can be, I think, little doubt that choleraic diarrhœa, Asiatic cholera and typhoid fever, are all due to microbes, although bacteriologists may not have definitely settled the nature of the microbes in each. In choleraic diarrhœa and cholera it is probable that the microbe acts to a great extent indirectly upon the organism by simply producing poisons in the intestine.

Cholera.—As I pointed out, in 1873, the symptoms of cholera are exactly those of muscarine poisoning, and most of the recent researches on the subject have tended to show that these symptoms are due to the action of a chemical poison which may act independently of the microbes which produce it. Lewis and Cunningham showed in 1874 that boiled cholera dejecta would still cause diarrhœa, although any microbes present in them must have been destroyed in boiling. Cantani and Klebs have also obtained symptoms of poisoning for sterilized cultivations of the cholera bacillus. Pouchet obtained an oily base belonging to the pyridine series from cholera stools, and Brieger got from pure cultivations of the comma bacillus in beef broth, in addition to the common ptomaines of putrefaction, two poisons which he regarded as specific products of the comma bacillus. But none of the poisons which have been isolated produce exactly the symptoms of cholera. In Cantani's experiments, tremor, prostration, spasms, and repeated vomiting were observed, while Klebs noticed muscular contractions and alterations of the kidney. The poison obtained by Pouchet irritated the stomach and slowed the heart, while one of Brieger's produced muscular tremor and cramps; the other lethargy, and feebleness of the circulation, with occasional bloody diarrhœa. These facts render it probable that the symptoms in cholera are not caused by a poison formed by the action of the comma bacillus alone, and it is evident that much more extended investigation is required before the pathology of cholera is accurately understood.

In all such investigation, too, one must bear in mind the possibility of the poison being formed not in the intestines merely but in the blood or tissues.

Typhoid Fever.—In typhoid fever the symptoms do not point so much to the formation of a poison affecting the body generally, as to the local action of the microbes upon the intestine, although in some epidemics of typhoid the intestinal symptoms are but slightly marked, while bronchial irritation is very prominent. Whether this bronchial irritation is due to the action of a microbe or to a ptomaine produced by it on the bronchial mucous membrane, I cannot say.

Treatment of Diseases depending on Microbes in the Intestine.

Coming now to the treatment of diseases depending upon microbes in the intestine, it is evident that the indications are, first, to remove both the microbes and the poisons they have formed as much as possible; secondly, to neutralize the injurious effects of poisons already absorbed into the blood; thirdly, to prevent or lessen the growth of any microbes which may still remain in the intestine, and prevent their forming any more poisons.

Eliminative Treatment.—It is curious to watch the changes in medical theory and medical practice, and I remember, when a student, being told that the prompt administration of an emetic would sometimes cause an attack of infective disease to abort. This eliminative treatment has now fallen into disuse, but the present state of our knowledge seems to show that it may not have been without its uses, and it may again be revived. The treatment of diarrhœa by purgatives is still largely followed, and with great advantage. In many cases, if we try to lessen the diarrhœa at once by the administration of chalk or opium, we only make matters worse, whereas a dose of castor-oil with a few drops of laudanum in it, just sufficient to lessen the irritation and not to interfere with the purgative action of the oil, will often put an end to the attack.

It is interesting to notice here, also, how modern researches appear to explain the empirical use of cinnamon water in the chalk-mixture with which the dose of castor oil is so frequently followed up. Cinnamon water no doubt contains a small quantity of tannin, which may have a somewhat astringent action; but the essential oil is probably its most important ingredient. This belongs to the aromatic series, and is probably a good antiseptic; while the oil of cloves, which, along with cinnamon, is an important ingredient of aromatic chalk powder, is an antiseptic of considerable power. Oil from one of the species of cinnamon (*Cinnamomum Culilowan*) is regarded in the Molucca islands as a powerful astringent in cholera.* Another common treatment of diarrhœa is the administration of camphor, which is a powerful antiseptic.

Modifications in Treatment necessitated by the Action of Antiseptics on the Organism.—It is evident that, while we can employ antiseptics outside the body without regard to anything but their power to destroy microbes, yet when we use them for intestinal disinfection, we are obliged to consider the effect that they may produce upon the organism.

When the contents of the stomach are undergoing decomposition either from yeast, sarcinæ, or bacteria, we may get good results by the use of creasote or carbolic acid, because these substances come directly into contact with the microbes in the stomach, and a quantity of them which is too small to be injurious to the patient will be sufficient to act as a disinfectant. If the intestine is to be disinfected, these drugs will not produce this effect so readily, because they will be partly absorbed in the stomach, and one has to look either for some remedy which on account of its sparing solubility will pass through the stomach into the intestines without being absorbed, or else one which will not have much poisonous action.

Intestinal Disinfectants.—Several remedies have lately been proposed as intestinal disinfectants. Napthaline, which has been recommended by Rossbach,† is very sparingly soluble, so much so that it passes to a great extent unchanged through the whole of the intestinal canal. It certainly destroys the disagreeable odour of the motions in infantile diarrhœa, but it does not appear satisfactorily to check the disease. Salol is the phenyl ether of salicylic acid. It passes through the stomach unchanged, but in the duodenum it is split up by the pancreatic juice into salicylic and carbolic acids. Although the carbolic acid is set free at the point where its action is wished, yet there is still the disadvantage of its being poisonous, and so betol has been recommended. The constitution of this substance is similar to that of salol, but it splits up into salicylic acid and beta-naphthol, which is much more sparingly soluble, and which is less poisonous than carbolic acid, while it is much more powerfully antiseptic. Resorcin, thymol, and benzoate of soda are among the antiseptic remedies which some-

* Husemann, *Arzneimittellehre*, 2te Aufl., p. 570.

† Rossbach, *Berl. klin. Woch.*, 1889, No. 42.

times are useful, but these are either weak or subject to the same objections as carbolic acid.

Direction in which to look for Intestinal Disenfectants.—When we consider the enormous number of aromatic compounds which have an antiseptic action, we may expect almost with certainty that amongst them most useful remedies are to be found for diarrhœa, and Pellicani has found that substances containing a diphenyl nucleus are less poisonous, and at the same time more powerfully antiseptic, than those containing a single phenol nucleus. This class of bodies is indirectly one in which we ought to search for intestinal antiseptics. But it is quite possible that some of these bodies, otherwise well suited to our purpose, may, like phenol, have an injurious action upon the organism, and the question arises whether this could not be obviated. Phenol and a very large number of the bodies allied to it are excreted in the urine as sulphates, or, to speak more correctly, as ethers of sulphuric acid, that is, a sulphuric acid in which one atom of the hydrogen has been replaced by the aromatic radical. Such a combination with sulphuric acid seems to destroy to a great extent the poisonous action of these phenyl compounds upon higher organisms, and by the administration of sulphates the poisonous effect of carbolic acid can be to a great extent neutralized.

Phenyl sulphuric acid, or sulpho-carbolic acid, forms salts with bases, and these salts, though somewhat less powerful disinfectants than carbolic acid, are not nearly so poisonous. They were introduced into medicine in 1869 by Dr. Sansom, and have proved of considerable value as intestinal disinfectants.

As I mentioned before, the diphenyl compounds seem to have less toxic action than those containing a single phenyl group, and possibly the best direction to look for new intestinal disinfectants would be amongst the sulpho-compounds of the diphenyl group.

Sulphonic Compounds: *Aseptol.*—But there is another class of sulpho compounds, the sulphonic compounds, in which the atom of sulphur, instead of being united by means of oxygen to the aromatic nucleus, is attached directly to one of the carbon atoms in that nucleus. One such compound—ortho-phenol-sulphonic acid, or aseptol, as it has been christened—has been introduced both as a local antiseptic and as an intestinal disinfectant. The commercial aseptol is a solution containing one part in three, and it is administered internally, in the same dose as salicylic acid, in cases both of gastric and intestinal catarrh, and apparently with good results.

Starving out Bacteria.

Another indication for treatment, besides removing the microbes or destroying their activity, is to starve them out. Although microbes may be able to digest both albuminous and starch matters—and they may adapt themselves to a certain extent to altered nutrient media, so that when accustomed to grow upon albuminous matters they may learn to grow on starch and *vice versâ*—yet their action upon the new foods is not so great as that upon those to which they are accustomed.

In Infantile Diarrhœa.—For this reason Vaughan recommends that in infantile diarrhœa the administration of milk should be entirely stopped, as it simply affords nutriment to the bacteria, and is decomposed by them with poisonous substances. In place of it, beef-tea, rice-water, or pure water should be given, and this should be kept up for some days until the milk bacteria have probably died out. Thus we find that the most recent researches bring us back to the practice of Sydenham.

In Typhoid Fever.—The same question comes into consideration in regard to typhoid fever. In the treatment of cases of this disease some years ago, I occasionally allowed farinaceous food rather early, say at the end of the second week, because I thought that if properly softened it could not produce any mechanical irritation upon the intestine, however much ulcerated it might be. But several times the temperature seemed to rise so distinctly after the farinaceous food that I began to be very chary of allowing it, and the only explanation that I could think of was that, somehow or another, it might afford a more favourable nutrient medium to the bacilli.

Microbes in Serous Cavities and in Wounds.

Other cavities of the body, such as the bladder, uterus, pleura, and peritonium, may serve, like the intestinal canal, as a place where microbes may grow and form poisons. The same rules as to absorption apply to them as to the intestinal canal, and disinfectants must either be sparingly soluble or not powerfully toxic. This is also the case with wounded surfaces, at least, if the disinfectant is to be kept in constant contact with them, for they absorb rapidly, and, moreover, the antiseptic must have little or no local irritant action. Carbolic acid has the twofold advantage of having a slight local anæsthetic action and being at the same time a powerful antiseptic, but a number of instances of poisoning by its absorption either from wounds or closed cavities into which it has been injected having occurred, surgeons have been for some years looking out for another antiseptic which would possess all its advantages without any of its disadvantages. In this search they have for a time forsaken carbon compounds, and have resorted to the use of mercurial salts, to some extent at least; but yet, at the same time, a number of new organic substances have been under trial, and have been more or less successful.

Chlorine, bromine and iodine in their free condition are amongst the most powerful antiseptics that we possess, and it seemed likely that the organic compounds containing them in large quantity would have an antiseptic action. Accordingly, iodoform (CHI_3), corresponding in its chemical structure to chloroform ($CHCl_3$), which is itself antiseptic, but containing iodine in place of chlorine, was tried, and for a while was much praised, but further trials have shown that it is by no means as powerful as an antiseptic, and is perhaps even more dangerous than carbolic acid. Its special advantages were supposed to be that the iodine which it contained was only set free by living protoplasm, and thus it might act as an antiseptic and kill microbes just as sulphur, though itself an inert powder, will destroy the fungus of the vines on which it is sprinkled, because from it the protoplasm of the fungus forms sulphurous acid or sulphuretted hydrogen, by which it is itself destroyed. When sprinkled on a wound iodoform prevents the movements of leucocytes, renders the surface dry, prevents suppuration, and encourages granulation, while at the same time its local anæsthetic action lessens pain. It seems to have a special destructive action on the tubercular abscesses. One great convenience of iodoform consists in the fact that it can be applied as a powder over any surface, and will there exercise its antiseptic action for a long time without the necessity of any dressing being applied over it; but as I have said, it is not without its dangers, and although sparingly soluble, it may yet be absorbed from wounds or cavities to such an extent as to produce poisoning. The symptoms of poisoning are particularly interesting, as they consist of a peculiar combination of the action of iodine itself with that of an alkyl. Like an iodide, it may produce unpleasant taste and smell, running at the nose, and gastric disturbance; but it behaves also like a member of the alcoholic series in causing special symptoms of poisoning which are connected with the nervous system, and consisting of loss of memory, variable

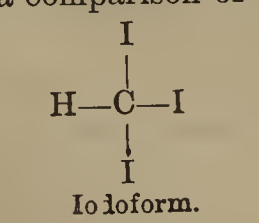
temper, headache, sleeplessness, and especially mental disturbances, sometimes amounting to furious mania, alternating with coma. Fatty degeneration of the heart and other organs is usually found after death.

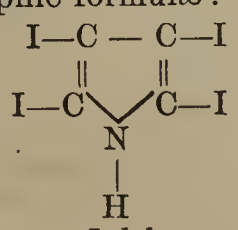
Iodol.—On account of this poisonous action of iodoform another organic compound of iodine has been introduced. In this the proportion of iodine is somewhat smaller, and the carbon compound with which it is combined, instead of belonging to the alcoholic or open-chain series, belongs to the class intermediate between it and the aromatic series. In it four carbon atoms along with one of nitrogen form a closed ring, and to this four atoms of iodine are attached. This body, iodol, is a yellowish powder, which can be used exactly like iodoform. It has over iodoform the advantage of being free from any disagreeable odour, and of being less poisonous. In animals, however, it produces in large doses symptoms similar to those of iodoform, and it has the disadvantage of being somewhat more irritant locally.

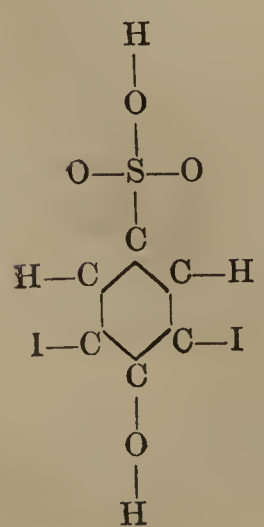
Sozoiodol.—As the antiseptics I have already mentioned, although useful, are not without their disadvantages, one would naturally look for something else which might be free from them, and one of the first ideas which would occur to a chemist would be to combine the iodine with some compound of the aromatic series instead of one of the fatty series, as in iodoform, or of the intermediate series, as in iodol. This has been done, and a large number of preparations have been introduced under the name of sozoiodol. This is a compound of iodine with paraphenol sulphonic acid, which only differs from sozolic acid, or orthophenol sulphonic acid, which I have already mentioned, in the position of the hydroxyl and sulphonic groups. Sozoiodol forms salts like phenol, the hydrogen in the sulphonic group being replaced by a base. The salts chiefly used have been those of sodium and potassium, and they been employed either in watery solutions, or mixed with talc or sugar of milk as powders in place of iodoform, or in the form of ointments. Like iodol, they have the advantage over iodoform of being without smell, and, so far as experience has yet gone, they produce no poisonous effect.

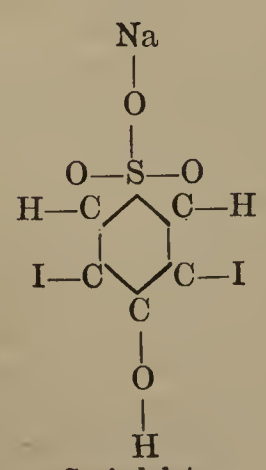
Chlorine Compounds.—Another natural idea is to combine chlorine instead of iodine with phenol, and this has been tried. Trichlorphenol contains three atoms of chlorine in place of three of hydrogen. It has a somewhat disagreeable odour, it is almost insoluble in water, but forms salts, and those of calcium and magnesium have been found to be not only powerful disinfectants, but to have no irritating action on the tissues.

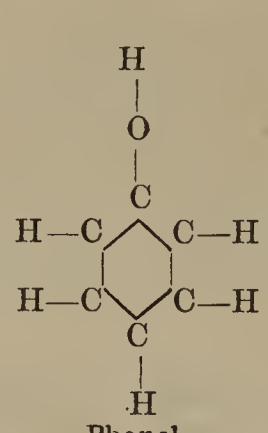
The relation of these antiseptics will be evident from a comparison of their graphic formulæ :—

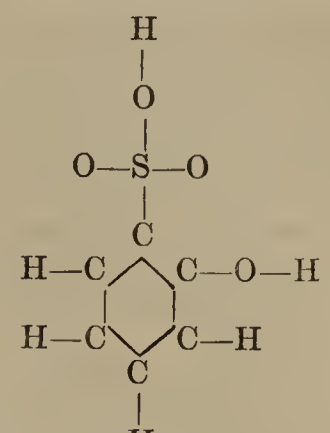

Iodoform.

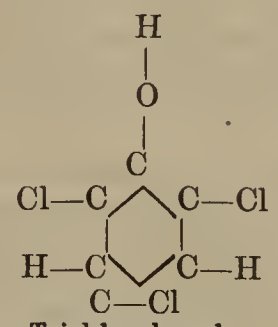

Iodol.


Soziodolic acid.


Soziodolate of sodium.


Phenol.


Sozolic acid (aseptol).


Trichlorphenol.

(*To be concluded.*)

Obituary.

JOHN PERCY, M.D., F.R.S.

The death is announced, on the 19th inst., of Dr. John Percy, at the age of 72 years. As a young man the deceased studied medicine in the University of Edinburgh, where he took his degree of M.D. in 1838, and afterwards in the medical schools in Paris. Subsequently he commenced medical practice in Birmingham and became physician to the Queen's Hospital there. The name of Dr. Percy is, however, more closely associated with metallurgy than medicine, he having been the author of a well-known standard work on the subject. This was, no doubt, one of the results of his appointment as the first lecturer on metallurgy in the School of Mines, a post that he occupied for nearly thirty years. At the time of his death and for some years previously he held the office of Superintendent of Ventilation in the Houses of Parliament.

Notice has also been received of the death of the following:—

On the 1st of May Mr. Thomas John Sale, Chemist and Druggist, High Street, Lowestoft. Aged 41 years. Mr. Sale was an Associate in Business of the Pharmaceutical Society.

On the 10th of June, Mr. George Waddington Ellis, Chemist and Druggist, Liverpool Road, Birkdale. Aged 33 years.

On the 13th of June, Mr. Thomas Hilditch, Chemist and Druggist, Tipping Street, Ardwick, Manchester. Aged 69 years.

On the 15th of June, Mr. Benjamin Cocker, Chemist and Druggist, Newington Green Road, London. Aged 59 years. Mr. Cocker had been a Member of the Pharmaceutical Society since 1872.

On the 16th of June, Mr. Robert Burch, Chemist and Druggist, High Street, Saffron Walden. Aged 86 years.

On the 20th of June, Mr. Henry Singleton, Chemist and Druggist, Winsford, Cheshire. Aged 73 years.

Reviews.

THE YORK CATALOGUE OF BRITISH MOSSES.* By J. A. WHELDON, A.P.S.

The 'London Catalogue of Mosses and Hepaticæ' being out of print, Mr. J. A. Wheldon, A.P.S., who is

* York: Ben Johnson and Co., Michlegate. 8vo., pp. 1-16. 6*d*.

the Honorary Secretary of the York and District Field Naturalists' Society, at the suggestion of several bryological friends, has drawn up the York Catalogue, and thus supplied a distinctly felt want. In Yorkshire and Lancashire there are perhaps more students of bryology than elsewhere in Britain; and a catalogue of this kind, for marking desiderata in exchanges of species, or for recording lists of species occurring within different areas, becomes an absolute necessity to enthusiasts in the subject.

As an index catalogue to the herbarium it is perhaps not the best that could be devised. An index to the genera and to the pages on which they occur, would have much facilitated reference.

This list, however, is offered only in the absence of another edition of the London Catalogue, which Mr. Wheldon hopes will have the census numbers worked out more fully, and the recent corrections and additions incorporated.

Under the circumstances therefore we may congratulate Mr. Wheldon on exhibiting an amount of enterprise and energy that seems lacking in London, more especially seeing that he is engaged in pharmacy during the day. While criticism is disarmed by the unpretending preface to the Catalogue, it may perhaps be of interest to the compiler as well as to those bryologists who may read this notice to direct attention to a few of the omissions which have been noticed in glancing through its pages. A comparison with Braithwaite's British Moss Flora, so far as it has been issued, will show that several species there mentioned are omitted, *e.g. Ceratodon conicus*, *Fissidens rivularis*, *F. Curnowii*, etc. Others which have been recorded in botanical journals, etc., during the last few years as British, such as *Rhyncostegium rotundifolium*, *Eurhynclium abbreviatum*, *Bryum versicolor*, etc., might be added if the York Catalogue reaches a second edition before a new London Catalogue is issued.

As Dr. Braithwaite's flora will probably be the standard work for many years to come, and is in the hands of a large number of bryologists, the nomenclature adopted in his work might be utilized in a future catalogue, as far as it goes, and that of the remainder of the British species taken from Hobkirk's 'Synopsis,' as being the most generally useful. The method which has been adopted in the York Catalogue of selecting a few names from Berkeley, and others from Braithwaite and Hobkirk, seems to have more disadvantages than advantages. The labour of adding the few omitted species to the list will, however, be so much less than writing out a complete list for purposes of exchange, that in the absence of a new edition of the London Catalogue the York Catalogue will be a welcome and useful substitute.

Elementary Inorganic Chemistry: Theoretical and Practical. By A. Humboldt Sexton, F.R.S.E., F.I.C., F.C.S.*

This, like the respective works on quantitative and qualitative analysis by the same author, is a very well arranged and carefully written volume, and so far as it goes is admirably adapted to impart a sound knowledge of the general laws of the science, and of the nature and properties of many of the commoner substances. The laws and generalizations are stated in a very clear and intelligible manner, any exceptions to the general rules being noted, but no attempt being made to strain any facts so as to make them conform to general rules. If the theory or generalization does not cover any particular fact or class of facts it is noted that such is the case; for instance it is given as a general rule that molecules do not exist with free bonds of affinity, but that in certain exceptional cases, *e.g.*, NO, this rule apparently does not hold good.

A graphic method is adopted of calling attention to the volumes of gases reacting, and the volumes of the compounds formed, by placing small cubes or rectangles under the formula of each substance in an equation; these do not take up much room, and keep prominently in view the laws of combination by volume, and the molecular volumes of compounds.

The non-metallic elements and their compounds are described pretty fully, and the methods of demonstrating their composition, etc., explained and made clear by aid of illustrations; a brief summary at the end of each chapter recalls the most important of their properties, uses, etc. This part of the book, and the preceding section on the general laws and theories of the science are exceedingly well written, and everywhere show evidence of being kept abreast of recent developments.

The author's statements are so generally correct that we are rather surprised to find carbon disulphide described as a liquid with an intolerable odour; for although the commercial substance known as carbon disulphide certainly has a disagreeable smell, it is hardly fair to ascribe the effect of impurities to the substance itself, and a word of explanation to that effect might have been added.

The metals and their compounds are only very briefly treated of, being all included in a single chapter, but enough is said to give a general idea of the nature and properties of the more important. The first part of the book (constituting about two-thirds of the whole), concludes with a chapter on organic chemistry, which is too short to be of much use; the only compounds considered are acetic and tartaric acids and their salts, fats and oils, glycerine, sugar, starch, gluten, and alcohol. Moreover, in this short chapter, stearic acid, which is taken as a type of the fat acids, is represented over and over again as having 36 atoms of hydrogen *besides* the replaceable one.

The second part of the book consists of instructions for the practical carrying out of the operations mentioned in the first part; the experiments are well selected, and the directions sufficient to ensure their being properly performed. A third and fourth part contain exercises in chemical arithmetic, and general questions, and then follows a fifth part containing instructions for qualitative analysis. These are of very limited extent and apparently only intended to cover the syllabus of the Science and Art Department examinations, specimens of the papers given at those examinations being appended.

* London: Blackie and Son. 16mo. Pp. 1–320. 2*s.* 6*d.*

BOOKS RECEIVED.

Urines—Depots—Sediments—Calculs. Application de l'Analyse Urologique à la Séméiologie Médicale. Par E. Gautrelet. Paris: J. B. Bailliere et Fils. 1889.

Lectures on Massage and Electricity in the Treatment of Disease (Masso-Electrotherapeutics). By Thomas Stretch Dowse, M.D. Bristol: J. Wright. 1889.

The Uses of Plants. By G. S. Boulger, F.L.S., F.G.S. London: Roper and Drowley. 1889.

Tooth Extraction; a Manual on the Proper Mode of Extracting Teeth. By John Gorham, M.R.C.S. Third Edition. London: H. K. Lewis. 1889.

Chemistry: General, Medical and Pharmaceutical: including the Chemistry of the British Pharmacopœia. By John Attfield, F.R.S. Thirteenth Edition. London: Gurney and Jackson. 1889.

ANSWERS TO CORRESPONDENTS.

E. Rees.—*Cardamine pratensis.*

H. M. Hadfield.—*Phallus impudicus.*

F. R. Nichols.—See notice in last week's Journal.

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CONTRACTIONS OF TITLES.

*The following is a list of the contractions and the corresponding full titles of Journals most frequently used in "The Month." The titles prefixed by a * are those of official Journals.*

Amer. Drug. = American Druggist. New York. Monthly.
* *Amer. Journ. Pharm.* = American Journal of Pharmacy. Philadelphia. Monthly.
Annalen. = Justus Liebig's Annalen der Chemie. Liepzig. Monthly.
* *Apot.-Zeit.* = Apotheker-Zeitung. Organ of the Deutsche Apotheker-Verein. Berlin. Twice a week.
* *Archiv* = Archiv der Pharmacie. Berlin: J. Greiss. Twice a month.
* *Berichte* = Berichte der deutschen chemischen Gesellschaft. Berlin. Once or twice a month.
* *Brit. Med. Journ.* = British Medical Journal, London. Weekly.
Bull. Com. = Bulletin Commercial. Supplement to L'Union Pharmaceutique. Paris: Pharmacie Centrale de France. Monthly.
* *Can. Pharm. Journ.* = Canadian Pharmaceutical Journal. Toronto. Monthly.
Chem. Zeit. = Chemiker Zeitung. Cöthen. Twice a week.
Chem. Zeit., Rep. = Chemisches Repertorium. Weekly supplement to the Chemiker Zeitung.
* *Compt. Rend.* = Comptes Rendus des Seances de l'Académie des Sciences. Paris: Gauthier-Villars. Weekly.
Deut.-Am. Apot.-Zeit. = Deutsch-Amerikanische Apotheker Zeitung. New York. Twice a month.
Drug. Circ. = Druggists' Circular. New York. Monthly.
Glas. Med. Journ. = Glasgow Medical Journal. Glasgow: A. Macdougall. Monthly.
L'Union Pharm. = L'Union Pharmaceutique. Paris: Pharmacie Centrale de France. Monthly.
Med. Bull. = Medical Bulletin. Philadelphia. Monthly.
Med. Chron. = Medical Chronicle. Manchester: Heywood. Monthly.
Med. Pr. Circ. = Medical Press and Circular. London: A. A. Tindall. Weekly.
* *Monatshefte.* = Monatshefte für Chemie. Vienna. Monthly.
Mon. Scient. = Moniteur Scientifique. Paris. Monthly.
Münch med. Woch. = Münchener medicinische Wochenschrift. Munich. Weekly.
* *Ned. Tijdsch Pharm.* = Nederlandsch Tijdschrift voor Pharmacie, Chemie en Toxicologie. The Hague. Monthly.
Nouv. Rém. = Les Nouveaux Rémèdes. Paris. Twice a month.
Pharm. Centralh. = Pharmaceutische Centralhalle. Dresden. Weekly.
Pharm. Post. = Pharmaceutische Post. Vienna. Weekly.
Pharm. Rec. = Pharmaceutical Record. New York. Twice a month.
Pharm. Runds. = Pharmaceutische Rundschau. New York. Monthly.
Pharm. Zeit. = Pharmaceutische Zeitung. Berlin: J. Springer. Twice a week.
* *Pharm. Zeit. Russl.* = Pharmaceutische Zeitschrift für Russland. St. Petersburg. Monthly.
Répertoire. = Répertoire de Pharmacie et Archives de Pharmacie reunis. Paris. Monthly.
Scient. Amer. = Scientific American. New York. Weekly.
West. Drug. = Western Druggist. Chicago. Monthly.
* *Zeit. öst. Apot.-Ver.* = Zeitschrift des allgemeinen österreichischen Apotheker-Vereines. Vienna. Weekly.
Zeit. phys. Chemie. = Zeitschrift für physiologische Chemie. Strasburg: J. Trübner. Monthly.

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